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ABSTRACT

This document describes the program and activities of Modules and Monographs in Undergraduate Mathematics and Its Applications Project (UMAP) from July, 1976 through December, 1980. UMAP's twofold purpose has been to: 1) develop and disseminate self-contained modular materials in mathematics and its applications suitable for the undergraduate classroom, to help meet the increasing demand for professional education in mathematics; and 2) establish a self-sustaining consortium that will continue to produce materials after the initial period of funding by the National Science Foundation, and represent a broadly-based group of users and producers of such materials. The document notes all the major aspects of the project, and covers: Instructional Materials, Public Information Materials, Publication/Distribution, Resources to the Project, Consortium Development, Formative Evaluation, and Project Staff. Addenda provide: Chronology of Events; Sample Letters to Materials Developers; Modules-The UMAP Journal Editorial Board; List of Publications; Members-National Steering Committee; Members-Consortium Council; Information Materials-Subject Matter Panels; and Members-UMAP Central Staff. (MP)

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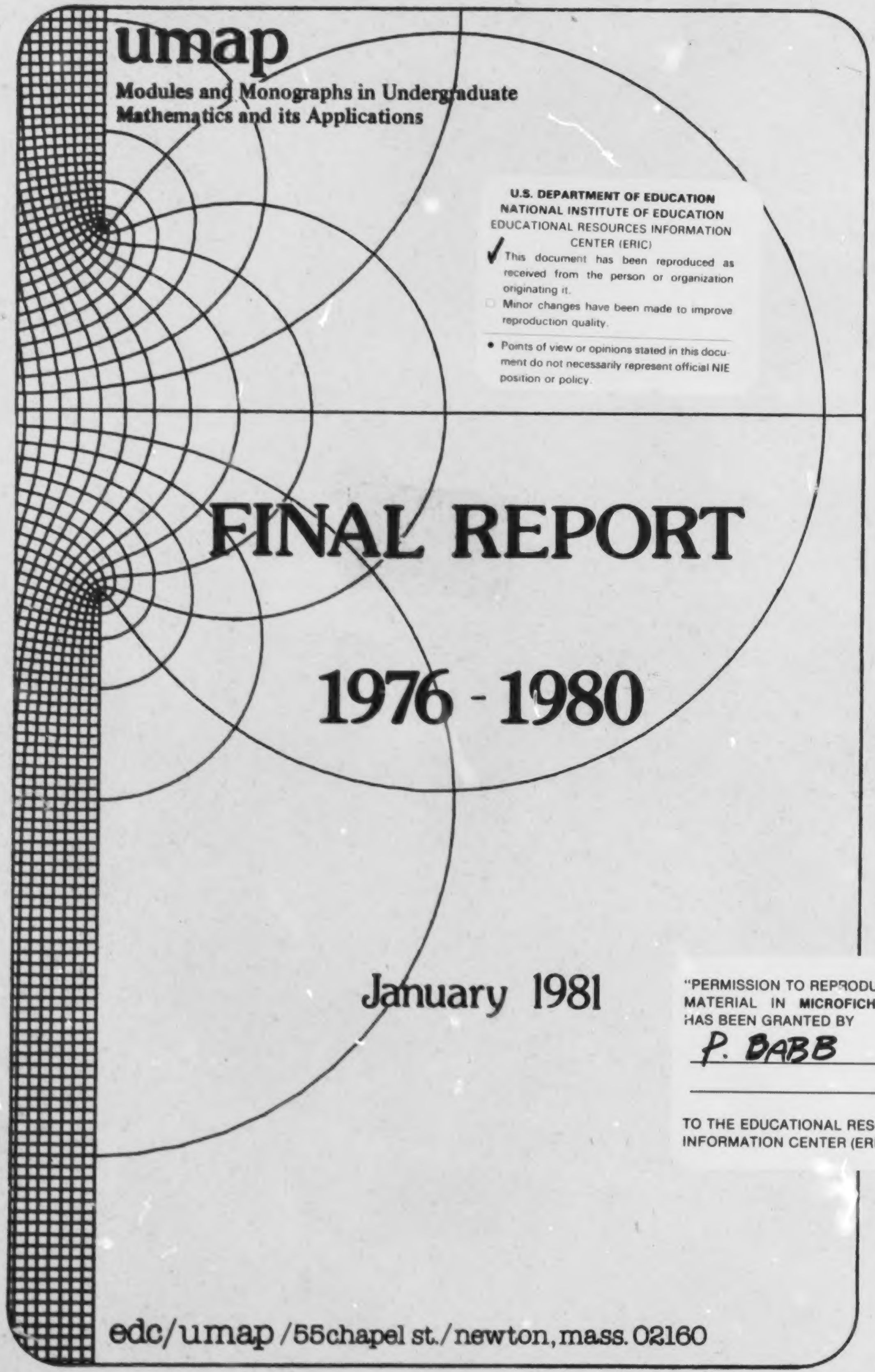

umap

Modules and Monographs in Undergraduate Mathematics and its Applications

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FINAL REPORT

1976 - 1980

January 1981

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FINAL REPORT
1976-1980

Modules and Monographs in Mathematics and its Applications Project (UMAP)

Ross L. Finney, Project Director
Solomon A. Garfunkel, Consortium Director
Felicia M. DeMay, Associate Director
January, 1981

Education Development Center, Inc.
55 Chapel Street
Newton, Massachusetts 02160

UMAP was supported by Grant No. SED-7619615 from the National Science Foundation. Any opinions, conclusions, or recommendations expressed are those of the authors and do not necessarily reflect the views of NSF.

DEDICATION

To W.T. Martin, whose professional and personal support and guidance have been invaluable to the Project from its inception. We are deeply grateful and honored by his participation.

NATIONAL SCIENCE FOUNDATION
Washington, D.C. 20550

FINAL PROJECT REPORT

NSF FORM 98A

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PART I–PROJECT IDENTIFICATION INFORMATION

1. Institution and Address Education Development Center 55 Chapel Street Newton, Mass. 02160	**2. NSF Program** Division of Science Education	**3. NSF Award Number** SED-7619615
	4. Award Period From July 1976 To Dec. 1980	**5. Cumulative Award Amount** $1,143,580.

6. Project Title Modules and Monographs in Undergraduate Mathematics and Its Applications Project (UMAP)

PART II–SUMMARY OF COMPLETED PROJECT *(FOR PUBLIC USE)*

The objectives of this project have been (1) to develop, through a community of users and producers, a coherent system of instructional modules and monographs in undergraduate mathematics and its applications which may be used to supplement existing courses and from which complete courses may be built, and (2) to provide a means for the continued production of innovative materials and a forum for the sharing of ideas and experiences through the support of the educational and professional community. Toward this end, we have founded the UMAP Consortium, a multidisciplinary organization whose membership includes more than 2,500 individuals from more than 1,500 institutions through the country.

The Project has developed an inventory of materials submitted by members of the Consortium and the scientific community at large, UMAP Subject Matter Panels operating in specific fields of application, and the UMAP Monograph Editorial Board. The review and development procedures are extensive in every case.

Materials which have been revised on the basis of peer review, student review, and classroom testing are published and distributed by Birkhauser Boston, Inc. In addition, Birkhauser is presently publishing The UMAP Journal, in cooperation with the Mathematical Association of America and the Society for Industrial and Applied Mathematics. The Journal incorporates instructional units and articles on applications of mathematics and their use in the college classroom.

UMAP has applied for incorporation and tax-exempt status from the State of Massachusetts and the Internal Revenue Service. The name of the corporation will be Consortium for Mathematics and Its Applications, or COMAP. The major purpose of COMAP will be the continuation of the activities and programs begun with the support of the National Science Foundation.

PART III–TECHNICAL INFORMATION *(FOR PROGRAM MANAGEMENT USES)*

1. ITEM *(Check appropriate blocks)*	NONE	ATTACHED	PREVIOUSLY FURNISHED	TO BE FURNISHED SEPARATELY TO PROGRAM	
				Check (✓)	Approx. Date
a. Abstracts of Theses *					
b. Publication Citations *					
c. Data on Scientific Collaborators *					
d. Information on Inventions					
e. Technical Description of Project and Results *	▨				
f. Other *(specify)*	▨				

2. Principal Investigator/Project Director Name *(Typed)* Ross L. Finney	**3. Principal Investigator/Project Director Signature** Ross L. Finney	**4. Date** 1/15/81

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INTRODUCTION

This report describes the program and activities of Modules and Monographs in Mathematics and Its Applications Project (UMAP) from July, 1976 through December, 1980. Funded by a grant from the National Science Foundation (NSF) (Grant No. SED-7619615) to Education Development Center, UMAP's twofold purpose is to:

1) Develop and disseminate self-contained modular materials in mathematics and its applications suitable for the undergraduate classroom to help meet the increasing demand for professional education in mathematics.

2) Establish a self-sustaining Consortium that will continue to produce materials after the initial period of funding by the National Science Foundation, and that will represent a broadly-based group of users and producers of such materials.

As of this writing, UMAP is funded by NSF (Grant No. SED-8007731) in the amount of $440,404 for two years. Contingent on the availability of funds and the scientific progress of the Project, NSF expects to continue support at approximately $191,750. The next four years marks the transition from UMAP as a curriculum development project to the Consortium for Mathematics and its Applications (COMAP). The goals for establishing this Consortium are:

1) The achievement of maximum input and participation of the mathematics and mathematics user communities in the production, review, and dissemination of modules and monographs.

2) The assurance that both the development and use of these materials continues after the expiration of NSF funding.

This report documents the efforts and activities undertaken by UMAP during the first four years toward achieving its stated goals. (See Addendum A for Chronology of Events.) All the major aspects of the Project are addressed, as indicated in the Table of Contents.

INSTRUCTIONAL MATERIALS

The materials developed by UMAP present significant applications of mathematical topics, theoretical development of some of these topics (when appropriate), and exposition at an elementary level of mathematics applications more commonly presented from an advanced viewpoint.

Modules. The instructional modules are lesson-length and self-contained, except for specifically-stated prerequisites, specifically-stated objectives and corresponding self-tests, answers to exercises and tests, special assistance supplements, and references to helpful selected materials. Copies of modules available for field-testing (Stage III) as of December, 1980, as well as those currently published and distributed by Birkhauser Boston, Inc., are found in Appendix A. CHART I on the following page shows the status of instructional module development from 1976 through 1980.

Monographs. Expository monographs are longer than modules, written for undergraduate students and instructional staff. Monographs treat mathematics and its applications in more depth than do modules, and incorporate exercises and answers to exercises. Copies of the monographs currently published and distributed by Birkhauser Boston, Inc., are found in Appendix B.

Materials development process. Stages of development include submission, reviews (by peer and students), revision, field-testing, and final revision before distribution as a final product. The stages of development for modules and monographs are found in Figures 1 and 2, respectively, on pages 5 and 6.

Management information systems. The development of instructional modules and expository monographs is accomplished through the efforts of hundreds of authors, reviewers, and field-testers throughout the country. In order to facilitate the development effort and to maintain communications among UMAP materials developers and users, the Project Office has established systems for management of information:

1) Filing systems. UMAP maintains two major filing systems: a) one for manuscripts (modules and monographs), reviews, revisions, field-test data, arranged in alphabetical order by author, and b) the other for incoming and outgoing correspondence, arranged in alphabetical order. The maintenance of the master filing systems is the daily responsibility of the Project Secretary (Donna DiDuca). UMAP also maintains separate files for returns of questionnaires, ballots for

CHART I:

DEVELOPMENT OF INSTRUCTIONAL MODULES

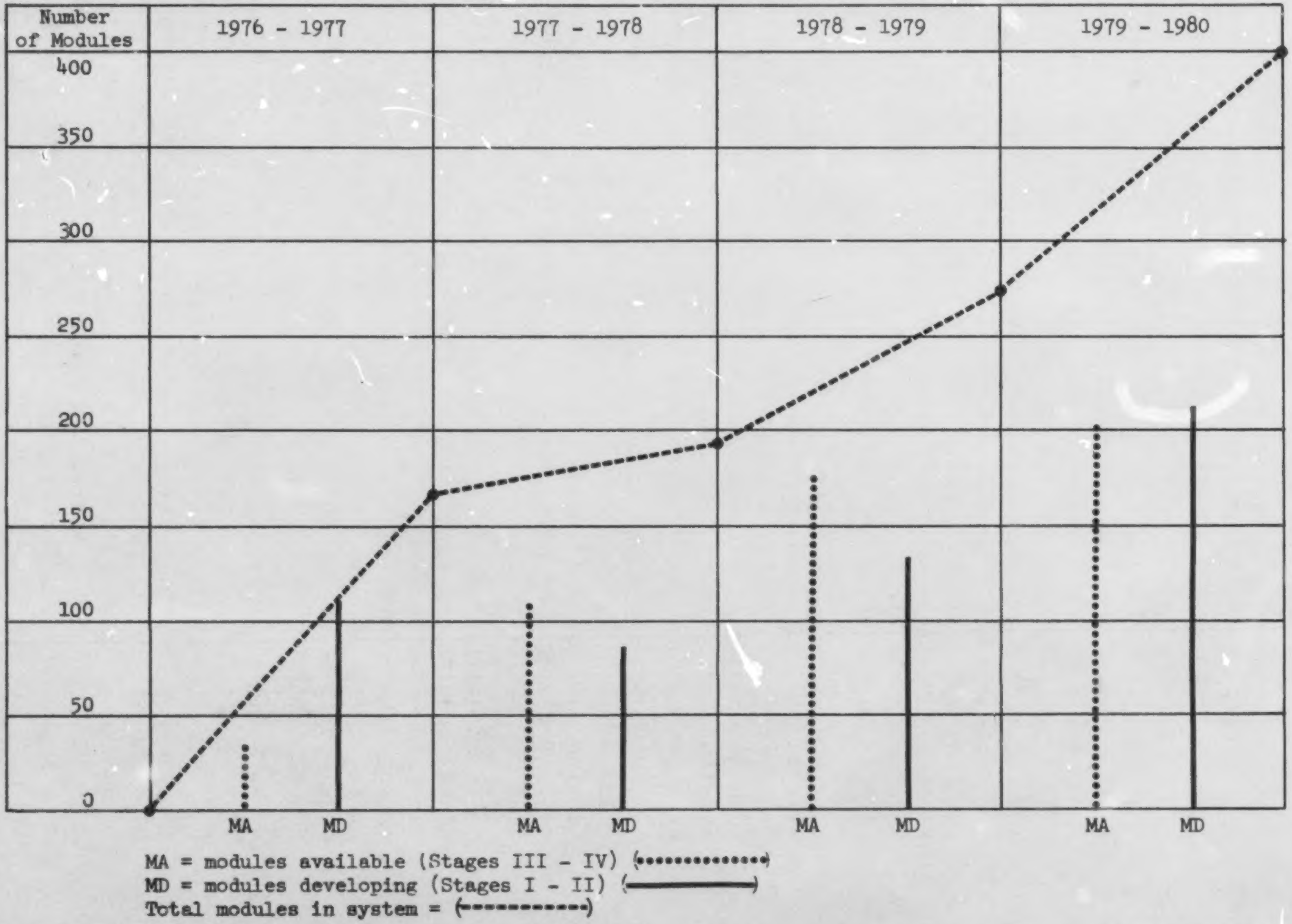


FIGURE 1
DEVELOPMENT OF MODULES

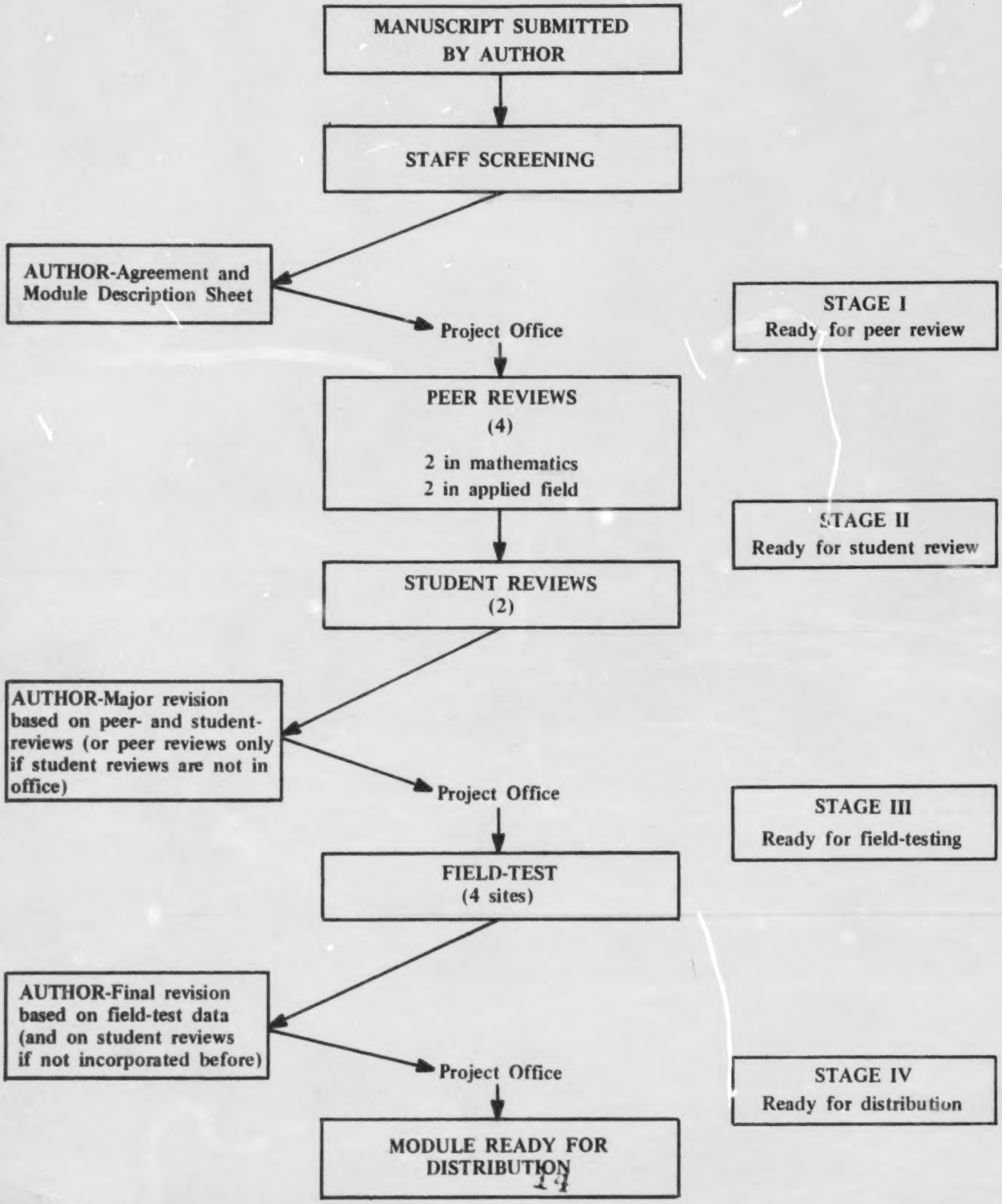
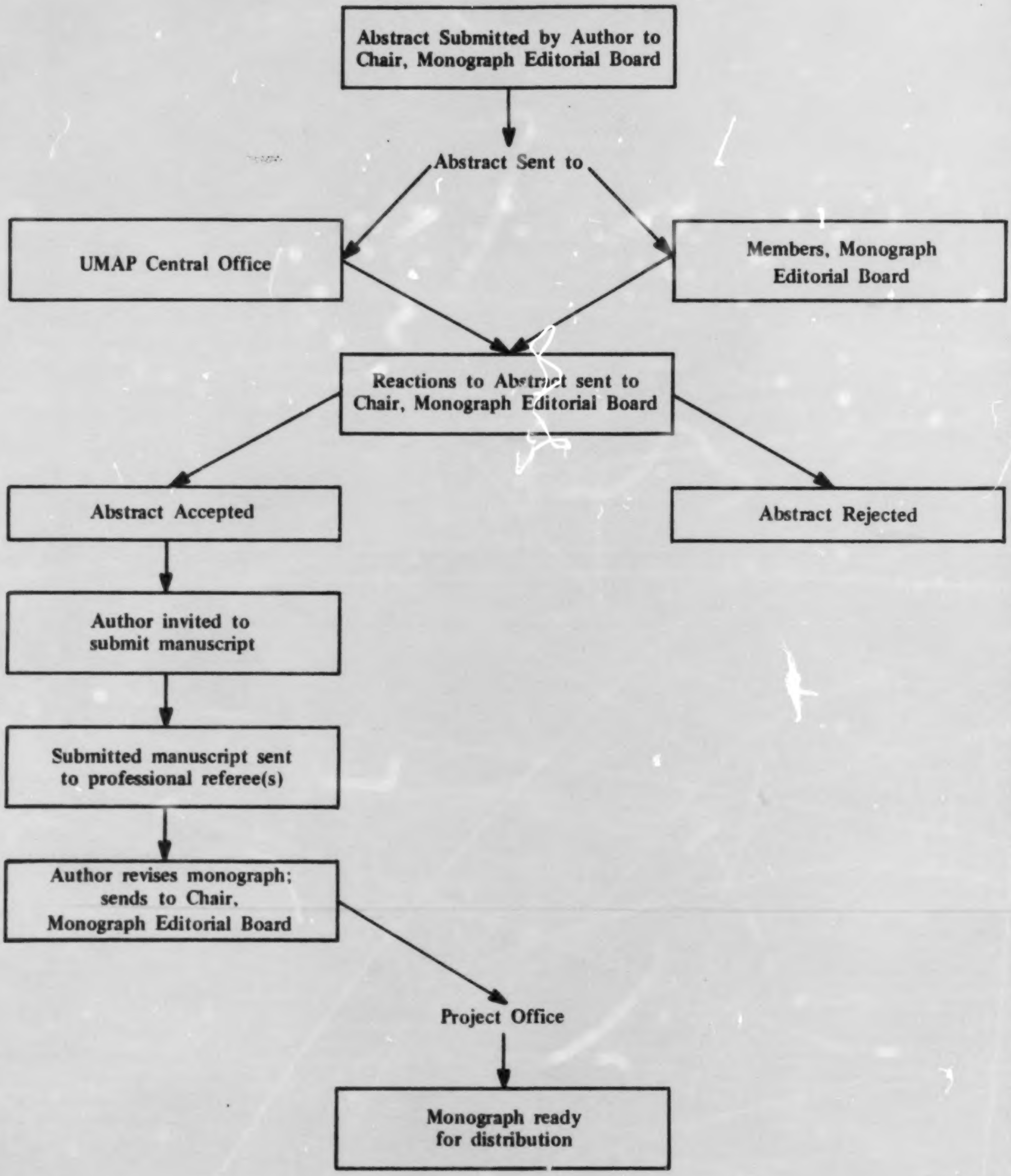

MANUSCRIPT SUBMITTED BY AUTHOR
STAFF SCREENING
AUTHOR-Agreement and Module Description Sheet
Project Office
STAGE I Ready for peer review
PEER REVIEWS (4)
2 in mathematics
2 in applied field
STAGE II Ready for student review
STUDENT REVIEWS (2)
AUTHOR-Major revision based on peer- and student-reviews (or peer reviews only if student reviews are not in office)
Project Office
STAGE III Ready for field-testing
FIELD-TEST (4 sites)
AUTHOR-Final revision based on field-test data (and on student reviews if not incorporated before)
Project Office
STAGE IV Ready for distribution
MODULE READY FOR DISTRIBUTION

FIGURE 2
DEVELOPMENT OF EXPOSITORY MONOGRAPHS


Abstract Submitted by Author to Chair, Monograph Editorial Board
Abstract Sent to
UMAP Central Office
Members, Monograph Editorial Board
Reactions to Abstract sent to Chair, Monograph Editorial Board
Abstract Accepted
Abstract Rejected
Author invited to submit manuscript
Submitted manuscript sent to professional referee(s)
Author revises monograph; sends to Chair, Monograph Editorial Board
Project Office
Monograph ready for distribution

Consortium Council nominees, reply forms from brochures and newsletters.

2) Card display. On a large bulletin board, UMAP maintains a display indicating the stage of development for each instructional module. The last action taken on a given manuscript is entered on a card (one per title) and is placed under the appropriate column indicating stage of development. This has been an effective reminder for staff when identifying bottlenecks in the system, and an efficient way for staff to check on the status of a given manuscript. The Associate Director (Felicia DeMay) and Assistant to the Directors (Paula Santillo) maintain the display on a daily basis.

3) Communications flow. A steady flow of correspondence between UMAP and materials developers and users occurs on a daily basis. While there are several letters that need individual responses, other inquiries and letters are handled with responses entered on the IBM Memory typewriter by Ms. Santillo. Some examples of letters to materials developers entered in the memory typewriter are found in Addendum B to this report.

--response to inquiry for general information,
--invitation to author of article to prepare a module,
--letter to reviewer to accompany manuscript,
--acknowledgement of receipt of review,
--reminder letter to reviewers,
--letter to author rejecting manuscript on basis of reviews,
--letter to author to accompany reviews of manuscript,
--acknowledgement of receipt of revised manuscript,
--letter to author (and reviewer) to accompany copy(ies) of printed module,
--letter to field-tester to accompany classroom copies of module,
--letter to author to accompany final copy of Stage IV revision, and
--letter to dean or department chair acknowledging work of author, reviewer, field-tester.

4) Word-processor. Since March, 1979, the word-processor has been used to enter master copy of instructional modules, expository monographs, articles for The UMAP Journal, and master copy of the Consortium Directory. The Coordinator for Materials Production (Barbara Kelczewski) and Word-Processor Technician (Janet Webber) are primarily responsible for entering copy onto the word processor.

PUBLIC INFORMATION MATERIALS

Public information materials are developed (1) to review and index available modular materials and to describe methods for using them, and (2) to inform the national mathematics and mathematics applications communities of the Project and to encourage wide participation. The information materials developed and disseminated are described below.

1) An Index and Descriptions of Available Mathematics Modules (Appendix C). Information for this Index was compiled from a survey conducted by the Project with the aid of the Special Projects Office of the Mathematical Association of America (MAA). The Index contains descriptions of modules produced by a variety of authors and organizations throughout the country. The descriptions include information about content, mathematics/applications field, prerequisites, output skills, cost, module availability. The entries are indexed by author's name, mathematics field, applications field, and organization.

2) A brochure (Appendix D) which gives a brief description of the Project and its activities, and solicits involvement from interested materials users-producers.

3) Quarterly editions of UMAP Projections (Appendix E), the Project newsletter. The newsletter is our mechanism for informing people about available materials for field-testing and distribution, Consortium development, people representing UMAP at professional meetings, and calls for materials. The first two issues of the newsletter in 1977 were sent to a mailing list of approximately 2,000 people. In four years, our master mailing list has grown to include more than 10,000 people.

4) A UMAP Catalog (Appendix F) (revised every six months) which contains descriptions of UMAP materials available for field-testing or distribution. It also lists materials that are being developed. This Catalog is automatically sent to the people who are involved with UMAP as authors, reviewers, field-testers, users, department representatives, and panel and committee members--a total exceeding 2,500 as of December 1980.

5) The UMAP Unit Sampler (Appendix G) (Volume I, 3 issues; Volume II, 4 issues) which served as a model for a developing journal. Each issue of the Sampler contained five to seven units in either Stages III or IV. Articles were solicited from module and monograph users and developers and incorporated in the Sampler.

6) Semiannual progress reports to the UMAP Steering Committee, the Consortium Council, and the National Science Foundation. These reports are used as a basis of articles submitted for publication in appropriate professional journals, and provide data and a framework for the final Project and evaluation reports.

7) The UMAP Consortium Directory, December 1980 (Appendix H), containing the names and addresses of more than 2,500 individuals involved with UMAP in various capacities--authors, reviewers, field-testers, members of panels and committees, and department representatives. The Directory serves as a resource for those interested in education in mathematics applications and who wish to interact with peers who share similar interests.

8) Articles about UMAP (Appendix I) that have appeared in other periodicals. Some of the articles were written by Project staff; others were written by Subject Matter Panels Chairpersons or others closely affiliated with UMAP.

PUBLICATION/DISTRIBUTION

Since the beginning of the Project, major concern was given to the eventual publication of UMAP materials. If UMAP is to achieve its long-term goals, these materials must meet the test of true market costs. Not only is publication an indicator of the viability and marketability of the materials, but it provides professional recognition to materials developers who contribute their time and expertise.

In accordance with federal guidelines (NSF Circular 123), UMAP sent information and letters of invitation to nineteen organizations--thirteen publishing companies, four university presses, two professional societies--who were known for their interest and involvement with mathematics and mathematics education. Several publishers expressed an interest in publishing the materials and in meeting with representatives of the Project.

The UMAP Steering Committee appointed an ad hoc Committee to consider the selection of a publisher. The members of the ad hoc Committee included W.T. Martin (MIT: Chair, UMAP Steering Committee); Lynn Steen (St. Olaf College; Chair, UMAP Consortium Council); Walter Sears (University of Michigan Press; Member, UMAP Steering Committee); Ross Finney (UMAP Project Director); and, Solomon Garfunkel (UMAP Consortium Director). The criteria for selection which the ad hoc Committee considered in selecting a publisher are listed below. The publisher should:

1) be willing to publish and distribute (through various modes) the largest feasible portion of the complete UMAP inventory;

2) have experience with and/or ability to penetrate the undergraduate market;

3) develop and implement prices that are reasonable for the intended audience, and be willing to negotiate a profit-sharing arrangement; and,

4) demonstrate an understanding of the objectives and the experimental nature of the Project and the necessity for working cooperatively with the Project.

Based on the criteria and consideration of such items as the publisher's experience with innovative materials, the extent of editorial work proposed, the plan for on-demand service of single modules, the plan for promotional effort, and pricing options, the ad hoc Committee recommended the selection of Birkhauser, Boston, Inc. as the publisher of UMAP materials. The UMAP Steering Committee endorsed the recommendation of the ad hoc Committee.

The publications contract between Education Development Center, Inc., and Birkhauser Boston, Inc., was approved by the

National Science Foundation at the end of December, 1979. Since January, 1980, Birkhauser Boston, Inc. has published and distributed:

- --The UMAP Journal, Volume I, Numbers 1-4 (See Appendix J),
- --instructional modules that have been revised on the basis of field-test data, and
- --expository monographs that have been revised on the basis of reviews.

The UMAP Journal is a quarterly publication, intended to acquaint readers with a wide variety of professional applications of the mathematical sciences, and provide a forum for discussions of new directions in mathematics education. Each issue contains instructional units selected from the UMAP inventory, and articles that cover the use of mathematics and statistics to solve problems that come in from outside of mathematics. There are reviews and explanations of current mathematical and scientific jargon, as well as occasional articles about the history of mathematics and its applications, and about new training programs and teaching material. The Journal is multidisciplinary, and is published for a readership that includes undergraduate students as well as professionals who are concerned with undergraduate training in colleges and universities. A list of the members of the UMAP Journal Editorial Board is found in Addendum C to this report. A list of materials published by Birkhauser Boston, Inc., is found in Addendum D to this report.

CHART II, on the following pages, presents the at-cost distribution of Stage IV modules and completed monographs from 1977 - 1979, and the sales data from Birkhauser Boston, Inc. from January - November 30, 1980. The data covering January - June 30, 1980 are more detailed since this represents sales reflected in the royalty payment by Birkhauser to Education Development Center. The data from July 1 - November 30, 1980 are composite numbers.

CHART II: DISTRIBUTION OF UMAP MATERIALS

MATERIAL	DATE OF AVAILABILITY	1977-1979 (at-cost distribution)	JANUARY-JUNE 1980 (Birkhauser)	JULY-NOVEMBER 1980 (Birkhauser)
THE UMAP JOURNAL	1980		126 institutional subscriptions 669 individual	184 subscriptions--Vol. I 31 subscriptions--Vol.II 1 subscription--Vol.III
MONOGRAPHS				
Brams	3 - 79	158 copies	219 copies	56 copies
Cline	6 - 79	52 copies	101 copies	33 copies
Frauenthal	12 - 78	185 copies	118 copies	52 copies
Pfeiffer	12 - 78	153 copies	177 copies	24 copies
Straffin	10 - 80		93 copies	
MODULES				
Bedian #377	6 - 80	(field-testing)	22 copies	Approximately 2,000 copies of all available modules sold since July, 1980.
Calter #81-83	6 - 77	918 copies	22 copies	
Cannon #84	9 - 77	1.050 copies	46 copies	
#85	9 - 77	998 copies	37 copies	
#86	6 - 78	272 copies	16 copies	
#87	12 - 77	352 copies	27 copies	
#88	6 - 78	460 copies	20 copies	
Cohen #331	6 - 80	(field-testing)	1 copy	
Finney #162	1 - 79	299 copies	19 copies	
Horelick & Koont #67	12 - 78	248 copies	33 copies	
#68	7 - 79	435 copies	42 copies	
#71	4 - 78	694 copies	153 copies	
#72	9 - 77	1,399 copies	236 copies	
#73	5 - 80	(field-testing)	35 copies	
#74	7 - 80	(field-testing)	1 copy	
#75	9 - 80	(field-testing)	52 copies	
#232	7 - 79	111 copies	16 copies	
#240	7 - 79	183 copies	27 copies	
#241	8 - 79	150 copies	29 copies	

CHART II (continued)

MATERIAL	DATE OF AVAILABILITY	1977-1979 (at-cost distribution)	JANUARY-JUNE 1980 (Birkhauser)	JULY-NOVEMBER 1980 (Birkhauser)
MODULES				
Horelick & Koont #242	6 - 79	174 copies	34 copies	
#251	3 - 80	(field-testing)	15 copies	
Hoffman #269	7 - 79	326 copies	196 copies	
Kayne #268	1 - 79	482 copies	294 copies	
Keller, Sr. #105/109	7 - 80	(field-testing)	34 copies	
#106/110	10 - 80	(field-testing)	4 copies	
#108/112	7 - 80	(field-testing)	10 copies	
Keller, E. #345	9 - 80	(field-testing)	69 copies	
Kleinbaum #377	3 - 80	(field-testing)	83 copies	
Lindstrom #323	4 - 80	(field-testing)	38 copies	
Max #216	7 - 80	(field-testing)	10 copies	
Maynard #272	4 - 80	(field-testing)	87 copies	
Meyerson #267	4 - 80	(field-testing)	19 copies	
Montgomery #292	11 - 80	(field-testing)	16 copies	
Nevison #294	6 - 79	164 copies	69 copies	
#376		(field-testing)	129 copies	
Rheinboldt #263	7 - 80	(field-testing)	79 copies	
Salert #299-300	8 - 79	117 copies	24 copies	
Schey #60-62	4 - 79	278 copies	32 copies	
Schoenfeld #203-205	6 - 77	1,856 copies	325 copies + 250 Solutions Manuals	
Tuchinsky #206	6 - 78	355 copies	66 copies	
#207		(field-testing)	21 copies	
#209	11 - 80	(field-testing)	1 copy	
#210	11 - 80	(field-testing)	19 copies	
#211	7 - 80	(field-testing)	99 copies	
#215	4 - 80	(field-testing)	26 copies	
Whitley #341		(field-testing)	139 copies	

RESOURCES TO THE PROJECT

National Steering Committee

From the beginning of Project UMAP, the role of the Steering Committee (Chair: W.T. Martin, M.I.T.) was to oversee the Project, and to make recommendations to the EDC Administration, the Project Director, and the NSF on the policy and operation of the Project. (See Addendum E for a list of Steering Committee members.) The Steering Committee was an independent body representing the public interest (that is, the potential consumer--both students and faculty) and the national need. The Steering Committee maintained a detailed awareness of the quality, quantity, and format of the instructional materials and, as well, a real understanding of the operation of the Project. An Executive Committee of the Steering Committee was formed, which acted on behalf of the Steering Committee between meetings.

Members of the Steering Committee were reimbursed for their expenses for attending Committee meetings, and for other trips undertaken on behalf of the Project. Membership on the Committee, however, was considered a service to the mathematical and educational community; therefore, honoraria were not offered to the members for participation at meetings.

A summary of the deliberations of the Steering Committee and Executive Committee follows. Unless otherwise indicated, all meetings were held at Education Development Center (EDC) in Newton, Massachusetts.

July 29-30, 1976

At its initial meeting, the Steering Committee discussed its role and its membership, as well as the long-range goals of the Project. Specific items of discussion included:

--Purpose and establishment of task forces on review procedures, search for and review of available modules, content development and coordination, author development, relationship to MAA and other professional societies, instructional use of modules, testing and assessment, non-print materials, selecting and sequencing modules, and dissemination and publication.

--Establishment, role, and operation of the first four Subject Matter Panels: Physics (Chair, James Tanner, Georgia Tech University), Biology (Chair, Robert Tamarin, Boston University), Analysis (candidates for Chair were identified), and Political Science (G. Robert Boynton, University of Iowa).

--Outreach strategies for development of the UMAP Consortium. Solomon Garfunkel was appointed Staff Liaison of a Subcommittee on Consortium Development.

--Distribution and publication of UMAP materials. Arnold Strassenburg (Program Manager, NSF) clarified that plans for commercial publication must conform to NSF Circular 123. Printing and at-cost distribution of developing materials could be done through EDC, but a separate account must be established to record income.

--Approval of William M. Weber, C.M. Leinwand Associates, Inc. as Project Historian.

--Evaluation. Strassenburg reported that NSF would appoint a third party to examine whether NSF program goals were being achieved by UMAP.

--Audience for Project materials identified as undergraduate students of science, engineering, and technology who need instruction in college-level mathematics.

February 6-7, 1977

After reviewing the status of Project activities, the Committee offered several suggestions, including:

--Monographs should supplement existing texts, dealing with topics that appear in many applications, but neglected in textbooks. Monographs should include a statement of specific prerequisites; these may lead to the development of modules to prepare students for reading a monograph. Monographs should start with problems and develop relevant mathematics.

--The Project's original goals were to serve students in the first two years of undergraduate mathematics. Though this was broadened to include all of the undergraduate years, the first two years should still be UMAP's priority audience.

--There is a need to work through societies of other disciplines (as well as through MAA and SIAM for mathematics). UMAP needs to develop a project description that can be submitted to various journals. Subject Matter Panels should try to submit information to journals of their respective disciplines.

Topics of new business included:

--Formation of an additional Subject Matter Panel in the area of Finite Mathematics.

--Establishment of task forces on instructional use of modules (no Chair identified), testing and assessment (Chair: Llayron Clarkson, of Texas Southern University), non-print materials (no Chair identified), selecting and sequencing modules (Chair: Jose Alonzo, of Rice University), and dissemination and publication (Chair: Walter Sears, of University of Michigan Press).

--Evaluation. Conrad Katzenmeyer (representative from NSF) reported that NSF wanted the project to develop a design and proposal for evaluation, covering the areas: 1) formative evaluation of the modules; 2) impact of modular instruction; and, 3) the consortium as a means of developing and disseminating modules.

--Undergraduate audience. Since students who might eventually receive degrees in science, engineering, and technology were enrolled in all types of institutions (two-and-four-year colleges, universities, technical schools), UMAP should include input from all those types of institutions.

--Criteria for selection of modules appropriate for UMAP: 1) material of value not otherwise available--new applications, new module topics; 2) presentation of material should be improvement over traditional presentations; 3) material should be geared toward audiences not well served by traditional mathematics curriculum; and 4) material should stress real-world applications rather than hypothetical applications.

September 16, 1977

A special meeting of the Steering Committee was held to deal with issues surrounding the resignation of the Principal Investigator. The Committee met in closed session, interspersed with conferences with the President of EDC and principal staff of the Project. As a result of the meeting, the Steering Committee acted on the following motions:

1) That the Committee endorse the nomination of Ross L. Finney as Director of the present UMAP grant for its duration.

2) Between now and the scheduled November meeting, the Steering Committee will conduct a study of the progress of the Project and Ross Finney's performance and will make a recommendation concerning the renewal proposal. For this purpose, the Executive Committee will make two or three visits to EDC between now and the November meeting and report to the Steering Committee.

3) In recognition of Sol Garfunkel's growing level of involvement with the Project, his long association with it and his outstanding contributions, that Sol Garfunkel be named Associate Director.

4) That Felicia (DeMay) Weitzel be named Associate Director for Administration.

5) That the Committee approve the revised budget for Project UMAP.

The Committee voted unanimous approval on all the motions and, on September 22, presented them to the National Science Foundation for its approval.

November 4-5, 1977

In addition to examining the status of the Project as reported by Project staff, the Committee discussed the following issues:

--Materials production. UMAP should keep thorough records on the progression of modules, and analyze why some stages of development take longer than others. Modules in applied fields should capture the interest of students in the applied fields, as well as mathematics students.

--Subject Matter Panels. Candidates for Physics Panel Chair and Steering Committee member were considered. The title of Biology Panel has changed to Life Sciences Panel. The next new panel to be established should be the Statistics Panel.

--Consortium development. The next two years will be critical for Consortium development if UMAP is to ensure continuing production and use of the best possible materials beyond the period of federal support. We need to establish a multidisciplinary constituency through the work of the Subject Matter Panels, collect and disseminate information on the use of materials in the classroom, and begin to design formal individual and institutional membership plans.

--Publication of UMAP materials. Whatever the publication mechanisms, the concept of modular materials and their educational use should not be jeopardized. Individual modules should be kept available on-demand. The Journal notion--incorporating instructional modules and articles--is important to pursue.

--Evaluation. The Office of Program Integration at NSF is dealing with the issue of conducting a widespread evaluation of the modular approach in general, rather than supporting external evaluations of each project. Since the issue is not resolved, UMAP will incorporate an evaluation section in its continuation proposal to NSF.

March 31 - April 1, 1978

This Committee meeting was held in conjunction with an NSF site visit to examine UMAP's continuation proposal. Topics of discussion included:

--Goals of the Project. The goals, as stated in the original proposal, were re-examined in terms of the stated goals of the continuation proposal. The goals have become inherent in all of the Project activities. As the Project focuses on immediate needs, it should not lose sight of the broader goals.

--Evaluation. The Project no longer engages the service of an historian, who recorded the perplexities, concerns, and decisions made by the Project. Since formative evaluation is critical to the development of the Project, it was recommended that UMAP incorporate an evaluation team (an education evaluator plus a doctoral student) in its continuation proposal.

--Monographs. The development of monographs has been costly and slow, and the purpose for monographs is not clearly stated. Monographs more thoroughly and extensively present information on subjects requiring more development than modules. Membership on the Monograph Editorial Board is expanding to include the Chairs of the Subject Matter Panels, who will coordinate development of monographs in their respective fields.

--Consortium development. UMAP should investigate how other existing consortia operate. The Project needs to project the costs of alternate models for the Consortium at alternate levels of production. The continuation proposal should relate to these projections.

--Materials production. The issues of the overall picture of the inventory of modules, and the possibility of conflicts or duplications among Panels' efforts were discussed. The Standing Committee on Content Development and Coordination looks at balance among current and promised materials, identifies gaps in which materials might be solicited, and promotes coordination of the Project materials.

--Budget. The Project was asked to prepare alternate budgets, relating them to a management plan, to an analysis of costs, and to the goal of continuing with a self-sustaining Consortium.

November 18-19, 1978

The issues covered at this Committee meeting included:

--Subject Matter Panels. The Political Science Panel will begin developing a second wave of materials that will focus on rational choice. The Committee supports the formation of panels in psychology and economics, and the re-formation of the physics panel through the efforts of Arnold Strassenburg and the American Association of Physics Teachers (AAPT).

--Evaluation. The Committee identified areas of investigation for the evaluation team to consider; for example, nature of institutions involved with UMAP, effect of the materials development system on the quality of the materials.

--Consortium development. Legal advice should be sought regarding filing for incorporation and tax-exempt status. The goals of the Consortium organization need to be specified, so we know what points are negotiable when discussing affiliation.

--Publication of materials. The Committee examined the criteria for selection of a publisher developed by Walter Sears and Lynn Steen.

In addition to the discussions summarized above, the Committee identified areas that needed further consideration and action; namely:

--paid memberships in the Consortium and benefits for that membership;
--relationship between the Steering Committee and the Consortium Council;
--developing some publicity strategies for UMAP, preparing articles for AAPT Announcer, The News (Political Science), MATYC Journal, National Science Teachers Association, etc.

April 21-22, 1979

The Committee focused its attention on: the use of UMAP materials, the publication plan, and Consortium development.

--Use of UMAP materials. Several Committee members expressed the notion that UMAP should conduct workshops to instruct teachers (especially those in subject areas other than mathematics) on the mathematics involved in the modules and how modules are used. If UMAP were to engage in conducting teacher-training workshops, additional monies and personnel would be required.

--Publication issues. UMAP approached publishers known for their involvement in undergraduate mathematics education, using the journal as focal point. Publishers expressing interest are MAA, Birkhauser Boston, Pergamon Press, M.I.T. Press, Freeman and Sons, and University Microfilms International. The Steering Committee empowered the committee on publications (Chair: Walter Sears, with Lynn Steen, W.T. Martin, Ross L. Finney, and Sol Garfunkel) to make a decision on which publisher should be recommended.

--Consortium development. UMAP has engaged the services of the Boston law firm, Choate, Hall, and Stewart in drawing up incorporation papers, and in filing for tax-exempt status. The Steering Committee suggested that one or two of its members, plus the Consortium Council, work on a Charter for the Consortium, including by-laws on governance.

October 27-28, 1979

Following the presentation on status of Project activities, the Committee discussed:

--Subject Matter Panels. Following a recommendation by the Consortium Council and an analysis of a questionnaire by the evaluators, the Committee voted unanimously that a Precalculus Mathematics Panel be established.

--Publication. Following a report by the sub-committee on publication, the Committee recommended Birkhauser Boston, Inc. as the publisher of UMAP materials. This selection should be documented and sent to the National Science Foundation for its approval.

--Evaluation. The Committee discussed the analysis of the Consortium questionnaire presented by the evaluators: (1) The 440 respondents were from universities (50%), four-year colleges (28.5%), two-year colleges (14.9%), and other institutions (6.5%). They were predominantly affiliated with mathematics (80.6%), and the average members were male, white, and 40 years of age. (2) Most people became aware of UMAP through written announcements (21.3%), displays at conferences (17.2%) and mailings (15%). (3) There are more people from universities involved with UMAP than four-year colleges and two-year colleges. Involvement from four-year college people is growing; two-year college people are under-represented.

April 26, 1980

The Executive Committee of the Steering Committee and the Chair of the Consortium Council met to discuss questions presented from the National Science Foundation regarding the UMAP proposal for 1980-1984. Also discussed were:

--Legal status of Consortium, Inc. The officers of the corporation should be independent from the central staff. The Board of Trustees will be the responsible fiscal agent, and the Consortium Council will be responsible for program and policy decisions.

--Memberships. The Project will discuss with Birkhauser Boston the relationship between paid memberships (individual and institutional) and the publication of UMAP materials.

October 24-25, 1980

Immediately preceeding the full Committee meeting, a subcommittee met to discuss the transition from the Project to the Consortium. Issues discussed by the Transition Committee and the full Committee included: status of incorporation, transition from Steering Committee to Consortium Council, evolution of Steering Committee to National Advisory Board, officers of the Board of Trustees, terms of office and by-laws of the Consortium Council, and location and staffing needs of the incorporated Consortium (COMAP).

Consortium Council

An open meeting for all Consortium members was held in January, 1977, in conjunction with the Joint Mathematics Meetings in St. Louis. As a result of this meeting, a Consortium Committee was established, whose purpose was to plan strategies to initiate a formal Consortium structure. This Committee met in March, 1977, to prepare guidelines for a Consortium membership effort. These guidelines were presented to the Steering Committee in November, 1977 for ratification.

In November, 1977, the Steering Committee appointed a nominating committee for a slate of candidates to constitute the initial Consortium Council. The Council was to focus its attention on the development and continuation of a self-sustaining Consortium to succeed the UMAP Project. The first Consortium Council meeting (See Addendum F for a list of Consortium Council members.) was conducted in January, 1978, in conjunction with the Joint Mathematics Meetings in Atlanta. A summary of the deliberations of the Consortium Council follows.

January, 1978--Atlanta, Georgia

At this Consortium Council meeting, specific areas of Consortium development were assigned each Council member:

S. Garfunkel, Consortium Coordinator -- oversee the Council members' investigations, and begin examining how other consortia operate.

J. Malkevitch -- looking into departmental/institutional membership and outreach strategies.

L. Sagan -- outreach strategies to community and junior colleges.

L. Steen -- dissemination and publication concerns.

August, 1978--Providence, Rhode Island

The Council carefully examined the status of the search for a publisher and identified issues to consider in the selection of a publisher; for example,

1) copyright should be retained by EDC;
2) the publisher should have experience in reaching the audience we want; and,
3) a final round of questions and concerns should be sent to interested publishers for their response.

Lynn Steen will work with Walter Sears (Steering Committee member) in writing criteria for selection of a publisher. In addition to the publication design, the Council discussed:

--Formal outreach efforts. A major mailing will be sent to the Chairs of mathematics departments around the country, inviting them to appoint a representative to UMAP. The mailing will contain a cover letter describing the Project, sample instructional materials, and a list of people from the department already involved with UMAP.

--Two-year college involvement. Strategies of involving more people from two-year colleges should include:

1) submitting articles about UMAP in the appropriate two-year college mathematics journals;
2) having representation at National Council of Teachers of Mathematics (NCTM) and American Mathematical Association of Two-Year Colleges (AMATYC) regional and national meetings;
3) preparing displays for college bulletin boards with tear-off return forms; and,
4) preparing circulars to be included in mailings to two-year college organizations.

--Consortium Council membership. The Council recommended that a nominating committee, consisting of representatives from the Steering Committee and Consortium Council, draw up a ballot of candidates for Council membership. This ballot will be sent to everyone involved with UMAP.

January 1979--Biloxi, Mississippi

The Council discussed in detail the outreach mailing to the Chairs of mathematics departments:

--display the names and affiliations of key people involved with UMAP on the stationery,

--spell out the kinds of sciences served by the Project materials,

--ask if there are other departments at their institution which should be make aware of the Project, and

--explain the availability of the materials.

Other strategies for outreach were suggested

--using the UMAP newsletter, ask for names of people willing to represent the Project at local meetings,

--publish a Consortium membership list, and

- --disseminate materials at state or regional meetings.

In discussing use of modules in the classroom, it was suggested that

- --articles on the use of modules should appear in the UMAP newsletter,
- --a listing of a few standard courses, incorporating some sample modules, should appear in the newsletter, and
- --the UMAP Catalog contain an index of the modules by courses.

The Council discussed the possibility of MAA's cooperation with UMAP in the publication of a UMAP journal, and expressed the following observations:

- --A journal which focuses on the improvement of teaching mathematics is needed.
- --The image of MAA with respect to two-year colleges is improving.
- --The issue of membership in the UMAP Consortium should be clarified for those who are MAA members.
- --Aspects of UMAP that should be retained include (1) the creative outlet allowed to authors and reviewers, and (2) UMAP as an educational source of materials in applications.

August, 1979--Duluth, Minnesota

After discussing the status of Project and Consortium activities and related issues, the Council recommended:

- --the establishment of a Subject Matter Panel in Precalculus Mathematics,
- --in terms of publication, a varied pricing structure for subscriptions to The UMAP Journal, and for the purchase of UMAP materials, and
- --the addition of three elected members, in addition to one representative each from the Steering Committee and MAA, by January of 1980.

It was also established that the Council would interact with the Project staff on:

- --benchmark mailing to interested publishers,
- --incorporation issues (by-laws, nature and purpose of corporation, etc.), and
- --alternate design for the future Consortium.

January, 1980--San Antonio, Texas

Specific issues addressed by the Council included:

--The UMAP Journal. Criteria for selection of modules to appear in the Journal should be publicized to avoid possible misunderstandings. An article on criteria for selection, plus clarification of the entire publication effort, should appear in the next UMAP newsletter.

--Materials development. The Council unanimously voted that the Content Development and Coordination Committee (CDC) ask each of the Subject Matter Panels to submit to the Project Office topics which need to be developed. Each Panel will be asked to submit titles or abstracts of such topics which will appear in UMAP newsletters, along with a solicitation for authors.

--Incorporation. After discussing incorporation issues, the Council voted unanimously that the Consortium incorporate and that the Project staff initiate the proceedings to apply for incorporation and tax exemption.

August, 1980--Ann Arbor, Michigan

The Council considered various schemes for paid Consortium memberships--individual and institutional. The consensus was (1) $10 for individual memberships and (2) that institutional memberships should be coordinated with Birkhauser Boston, Inc., in order to work out feasible benefits for the institutional fee (probably $60-$70).

The Council recommended that a statement be incorporated in the by-laws of the organization that membership on the Council be balanced by geography, institutional type, minority, professional field, and sex.

In terms of outreach to scientific fields, the Council suggested that UMAP prepare articles to appear in publications of professional societies, and that specific people in the scientific area be contacted as catalysts, rather than try to contact all departments.

Subject Matter Panels

Subject Matter Panels, representing mathematics and mathematics applications communities, are established with the assistance of the Steering Committee for the purpose of developing instructional units in different subject areas. The responsibilities of the Panels include:

- --assessing the needs and resources in their respective subject areas with respect to mathematics applications materials;
- --recommending topics for development;
- --soliciting authors for materials;
- --conducting reviews of manuscripts submitted in their particular field.

The Monograph Editorial Board suggests topics for monographs, invites authors from various mathematical and scientific fields, and reviews submitted manuscripts. Membership on the Board and a materials production report begin on page 51.

The Project and Steering Committee established nine Subject Matter Panels, and the Monograph Editorial Board, under this grant. Reports on Panel memberships and Panel activities begin on the following page.

Not every Subject Matter Panel has been as productive and successful as the Project would have liked. This phenomenon compelled the Project and the Steering Committee to examine the structure and activities of the Panels, and to develop some criteria for the establishment of Panels. The following factors were identified before the last half-dozen Panels were established:

- --The Chair and Members need to be professionals in their fields, and be philosophically committed to the idea of developing and using modular materials. They must also be willing to volunteer their time.
- --The Panel should be committed to engaging in outreach activities to the audience particularly involved in the Panel's field.
- --Potential members should have access to personnel of already existing Panels, to learn of successful operational strategies.
- --The membership of a Panel should represent more than one geographical area.
- --The Panel should have contact with professionals in its field in government and industry.

The Panels and Board perform a vital function in Consortium development. They serve to focus the energies of their constituent communities. They target areas for materials development and enlist authors, reviewers, and field-testers in the subject matter fields.

To coordinate the overall development of UMAP materials, the Steering Committee established a Standing Committee on Content Development and Coordination (CDC). Membership on the CDC Committee (Chair, William F. Lucas, Cornell University) consists of the Chairpersons of the Subject Matter Panels and the Monograph Editorial Board. A summary of discussions conducted by the CDC Committee begins on page 55.

Analysis and Computation Panel
(November 1976 - December 1980)

Originally established as the Analysis Panel in November, 1976 (Chair: Howard Resnikoff), the Panel focused its efforts on developing materials in the following areas: numerical analysis using the calculator and computer, orthogonal functions with application to time series and optical image processing, differential forms with application as a unifying theme, and asymptotic methods and perturbation theory as applied to topics at all levels from solving quadratics to quantum mechanics. Resnikoff resigned as Chair in May, 1977.

Professor Carroll Wilde assumed Chairmanship of the Panel in July, 1977. The Panel was broadened to include Analysis and Computation, and the efforts of the Panel were shifted to reach a broader audience--all levels of undergraduate mathematics education, rather than upper division mathematics. In addition to working on development of manuscripts submitted by instructors from colleges and universities, the Panel nurtured contacts with people in industry and government through participation in Society for Industrial and Applied Mathematics (SIAM) meetings.

Under the Chairmanship of Professor Carroll Wilde, the Panel has been very active in soliciting and developing manuscripts, in reviewing and editing manuscripts submitted by other Panels or by individual Consortium members, and in representing the Project at regional and national professional meetings. Professor Wilde is in close contact with the Project Office, and has encouraged the Panel members to interact directly with the Project Office when coordinating the development of modules they have solicited.

Chair: Howard Resnikoff (November 1976-May 1977)
University of California, Irvine

Carroll O. Wilde (July 1977-present)
Naval Postgraduate School

Members: Richard J. Allen (November 1978-present)
St. Olaf College

Louis C. Barrett (April 1978 - present)
Montana State University

G.R. Blakley (February 1978 - present)
Texas A & M University

Craig Comstock (September 1977 - October 1978)
Naval Postgraduate School

Alan Huckleberry (November 1976 - January 1978)
Notre Dame University

Alfred Inselberg (November 1976 - September 1977)
IBM, Los Angeles

Roy B. Leipnik (September 1977 - present)
University of California, Santa Barbara

James G. Taylor (September 1977 - November 1977)
Naval Postgraduate School

Maurice D. Weir (January 1979 - present)
Naval Postgraduate School

Manuscripts solicited and developed by Panel

Dershem: Computer Problem Solving
Dershem: Iteration and Computer Problem Solving
Giordano, Wells, Wilde: Dimensional Analysis
Grimm: A Unified Method of Finding Laplace Transforms, Fourier Transforms, and Fourier Series
Grimm: Inversion Method of Finding Laplace Transforms, Fourier Transforms, and Fourier Series
Rice and Wilde: Error Correcting Codes I
Uebelacker: A (Not Really) Complex Method for Finding Solutions to Linear Differential Equations
Wagon: Evaluating Definite Integrals on a Computer: Theory and Practice
Whitley: Five Applications of Max-Min Theory from Calculus
Wilde: The Contraction Mapping Principle
Wilde: The Poisson Random Process
Wilde: Calculus of Variations with Applications in Mechanics
Yiu and Wilde: Levi-Civita Tensor and Identities in Vector Analysis

Manuscripts under development by Panel

Barrett: Zeros of Functions
Barrett: Interlacing Theorems (Vibrating Systems)
Barrett: Separation Theorems (Sturm-Liouville Problems)
Barrett: a sequence of modules on Green's Functions
Barrett and Grimm: Linear Ordinary Differential Equations by Vector Methods
Blakley: Analytic Functions
Blakley: a module on Cryptology
Harrison and Wilde: Coupled Oscillators
Hasling and Freeman: A Pocket Solution to Poisson's Equation for Meteorologists and Oceanographers
McLeod: Continuity and Limits
Rice and Wilde: Error Correcting Codes II and III
Weir: modules on differential and integral calculus

Manuscripts submitted by Consortium and reviewed by Panel

Beltrami: Stochastic Model for the Allocation of Fire Companies (monograph)
Bender: Traffic Flow-Laplace Transforms
Berresford: Differential Equations and Root Cellars
Boldt: Geometrical and Functional Insights Concerning the Consequences of Relativity Theory
Braden: Design of the Ideal Oscillating Sprinkler
Brooks: computer and calculus course modules
Chamberlain: Should the Gas Guzzler Go? (subsequently rejected)
Cooke: Almost-Periodic Functions
Dancis: Perturbations--The Effects of Measurement Errors
Dancis: Design Problems
Dancis: Computerized Tomography
Drobot: Dimensional Analysis (subsequently rejected)
Eisen: Applications of Difference Equations in Biology
Farnsworth: Differential Equations--Finding Solutions (subsequently rejected)
Fellin: Primitive Shift Registers
Fink: Sturmian Sequences for Isolating Zeros of Polynomials
Frauenthal: Smallpox: When Should Vaccination be Discontinued? (monograph)
Gordon: The Three Dimensional Trapezoidal Rule: Numerical Evaluation of Multiple Integrals
Grimaldi: Balancing Chemical Reactions with Matrix Methods and Computer Assistance
Hundhausen and Walsh: The Gradient and Some of Its Applications

Hundhausen and Walsh: Unconstrained Optimization
Lange: Coding and Number Theory
Mathews: Bilinear Transformations of the Complex Plane
Melka: Hill Climbing (subsequently rejected)
O'Neil: A Mathematical Model of a Universal Joint
Peressini: Application of Calculus to Satellite Motion and Orbital Maneuvers
Peressini: Rocket Equation and Rocket Flight Performance
Rheinboldt: Horner's Scheme and Related Algorithms
Rheinboldt: Computing Zeros of Functions
Rickey: Qualitative Graphing Techniques
Strecker: Keeping Dimensions Straight
Utz: The Sketching of Rational Functions (subsequently rejected)
Whitley: Some Applications of Exponential and Logarithmic Functions

Representation of UMAP at Meetings

10/31/77	Society for Industrial and Applied Mathematics Albuquerque, New Mexico (C. Wilde)
12/1-3/77	Shambaugh Conference for Political Science Authors University of Iowa (C. Comstock)
2 - 78	Northern California Section of MAA (C. Wilde and C. Comstock)
4/20-22/78	PRIME 80, Washington, D.C. (C. Wilde)
5/24-26/78	Society for Industrial and Applied Mathematics Madison, Wisconsin (C. Wilde)
10/29/78	Society for Industrial and Applied Mathematics Knoxville, Tennessee (C. Wilde)
2/22-24/79	Second Annual Workshop of Linkage Between Applied Mathematics and Industry, Monterey, California (C. Wilde)
6/11-13/79	Society for Industrial and Applied Mathematics Toronto, Canada (C. Wilde)
11/6-8/80	Society for Industrial and Applied Mathematics Houston, Texas (C. Wilde)
12/5/80	California Mathematics Council for Community Colleges; Monterey, California (C. Wilde)
Continuous	Spring and Fall meetings of the Executive Committee of the Northern California Section of MAA (C. Wilde)

Panel Meetings

February 1979 Naval Postgraduate School

Outreach Mailings

Winter 1978 R. Allen to regional schools, departments, colleagues to stimulate writing for UMAP

Biomedical Sciences Panel (June 1978 - December 1980)

The phenomenon of waxing and waning characterizes the evolution of this Panel. From its initial establishment as the Biology Panel in October, 1976 (R. Tamarin, Boston University, Chair), it became:

> the Life Sciences Panel in September, 1977 (No chair. A search for a Chairperson was begun by Donald A. Larson, SUNY at Buffalo, in cooperation with the Project Office.);
>
> the Biomedical Sciences Panel in June, 1978 (M. Anbar, SUNY at Buffalo, Chair); and, most recently,
>
> the Biomedical Sciences Panel in October, 1980, with Vincent Galluci, University of Washington, Seattle, as Chair.

When the Biomedical Sciences Panel met in October, 1978, they identified the areas for the primary generation of materials as physiology, biology, biophysics, and pharmocology. The Panel also agreed that they would find post-doctoral and graduate students to generate the first drafts of the materials. This stragegy did not come to fruition, as far as generating instructional modules. The Chair of the Panel did, however, assist in the review of manuscripts submitted by other Panels and individual Consortium members, as well as review appropriate articles submitted to The UMAP Journal.

With Professor Galluci as Chair, the thrust of the Panel will shift from emphasis on medicine to emphasis in biology. A group involved with Professor Galluci has already developed materials in the areas of fisheries, forestry, and aquatic ecosystems (See Addendum G, pages 1-2, for a list of titles.).

Chair: Robert Tamarin (October 1976 - September 1977)
Boston University

Michael Anbar (June 1978 - October 1980)
State University of New York, Buffalo

Vincent Galluci (October 1980 - present)
University of Washington, Seattle

Members: Vahe Bedian (June 1978 - October 1980)
State University of New York, Buffalo

Charles Bell (December 1980 -)
Biomathematics Group
University of Washington, Seattle

Graham Carey (December 1980 -)
Department of Mechanical Engineering
University of Texas, Austin

Douglas Chapman (December 1980 -)
Director, Center for Quantitative Science
University of Washington, Seattle

Max Chilcott (June 1978 - October 1980)
E.J. Meyers Memorial Hospital, Buffalo

Christopher Cox (June 1978 - October 1980)
University of Rochester

Robert Delangchamp (June 1978 - October 1980)
U.S. National Taxicological Laboratory

Christine Duggleby (June 1978 - October 1980)
State University of New York, Buffalo

Leon Farhi (June 1978 - October 1980)
State University of New York, Buffalo

Marjorie Farnsworth (June 1978 - October 1980)
State University of New York, Buffalo

Lawrence Gales (December 1980 -)
Academic Computer Center
University of Washington, Seattle

Daphne Hare (June 1978 - October 1980)
U.S. Veterans Administration Hospital, Buffalo

William Hatheway (December 1980 -)
Center for Quantitative Science
University of Washington, Seattle

Richard Hertzberg (December 1980 -)
Environmental Protection Agency
Cincinnati

Robert Klocke (June 1978 - October 1980)
E.J. Meyer Memorial Hospital, Buffalo

David Lalka (June 1978 - October 1980)
Buffalo General Hospital

Michael Levin (December 1980 -)
Department of Physiology
University of Texas, Houston

Robert Spangler (June 1978 - October 1980)
State University of New York, Buffalo

John Storrs (June 1978 - October 1980)
State University of New York, Buffalo

Robert van der Vaart (December 1980 -)
Biomathematics Program
North Carolina State University, Raleigh

Materials solicited and developed by Panel

Bedian: Evaluation of Diagnostic Tests and Decision Analysis

Materials submitted by Consortium and reviewed by Panel

King: The Pace of Life: An Introduction to Empirical Model-Fitting

Peressini: An Application of Calculus to Anatomy: A Mathematical Model of the Aorta

Economics Panel (October 1979 - December 1980)

This Panel was established in October, 1979, with Professor Gerald Egerer (Sonoma State University) as Chair. In addition to setting up membership on the Panel, Professor Egerer has stimulated the initial development of some prototype modules, reviewed several modules submitted by other Panels or individual Consortium members, written an article for The UMAP Journal on the development of mathematical economics, and arranged for an on-site visit to the Sonoma State University campus by Ross L. Finney.

Chair: Gerald Egerer (October 1979 - present)
Sonoma State University

Members: Richard Cornwall (October 1979 - present)
Middlebury College

Hugo Sonnenschein (February 1980 - present)
Princeton University

Materials under development by Panel

Beals: module on taxation
Beals: module on regression analysis
Johnson: Bayesian analysis of an investment decision
Ledbetter: matrices and linear algebra with applications in economics
Ledbetter: semi-definite integral with applications in demography
Ledbetter: word problems
Starr: application of Bouwer fixed point theorem to the determination of general equilibrium

Materials submitted by Consortium and reviewed by Panel

Falbo: Nonzero Sum Games
Lindstrom: Nominal and Effective Rates of Interest
Nevison: Price Discrimination and Consumer Surplus
Nevison: Differentiation, Curve Sketching and Cost Functions
Patten: The Present Value of a Variable Perpetuity
Wittman: A Mathematical Survey of Justice

Finite Mathematics Panel (June 1977 - December 1980)

As well as undertaking the development of manuscripts it has initiated, this Panel is responsible for having reviewed several manuscripts submitted by other Panels or individual Consortium members. In addition, Professor Rebman (Chair, June 1977-August 1979) developed a statement of philosophy and goals (See Addendum G, pages 5-6), and several Panel members have represented UMAP at regional and national professional meetings.

Professor Walter Meyer, Adelphi University, assumed Chairmanship of the Panel in September, 1979 (Professor Rebman remains as a Panel member), and has increased the membership on the Panel in order to stimulate the further development of manuscripts. Working closely with the Project Office, Professor Meyer maintains an active correspondence--not only soliciting authorship of instructional materials and articles for The UMAP Journal, but also contacting several people to initiate interaction between UMAP and industry.

Chair: Kenneth R. Rebman (June 1977 - August 1979)
California State University, Hayward

Walter Meyer (September 1979 - present)
Adelphi University

Members: Edwin Beckenbach (January 1980 - present)
University of California, Los Angeles

Sarah Brooks (October 1979 - present)
Mohawk Valley Community College

Lin Dearing (October 1979 - present)
Clemson University

James Frauenthal (October 1979 - present)
State University of New York, Stony Brook

Frank Giordano (October 1980 - present)
U.S. Military Academy, West Point

Allan Gottlieb (October 1979 - present)
York College, City University of New York

Robert Hayman (October 1979 - present)
Clemson University

John Howe (December 1979 - present)
University of Vermont, Burlington

Joseph Malkevitch (June 1977 - present)
York College, City University of New York

Rochelle Meyer (September 1979 - present)
Suffolk County Community College

Paul Pfeiffer (June 1977 - present)
Rice University

John Reay (June 1977 - present)
Western Washington State University

Kenneth R. Rebman (August 1979 - present)
California State University, Hayward

Edward M. Reingold (October 1980 - present)
University of Illinois, Urbana

Richard Ringeisen (October 1979 - present)
Clemson University

Philip Straffin (October 1979 - present)
Beloit College

Earl Glen Whitehead, Jr. (January 1980 - present)
University of Pittsburgh

Manuscripts solicited and developed by Panel

Gale: The Optimal Assignment Problem
Keller, E.L.: Matrix Applications in Population Studies
Lippman: Cumulative Voting by Corporation Shareholders
Malkevitch: Applications of Vertex Coloring Problems for Graphs

Manuscripts under development by Panel

Beres: on discrete dynamical systems
Beresin: on mathematical induction
Dearing: on location problems on networks
Eisen: Graphical Analysis of Some Difference Equations Occurring in Mathematical Biology
Goldberg: A Linear Algebraic Method for Balancing Chemical Equations
Golomb: One-Sided Operators in Rings
Gottlieb: on sorting by computer
Koehler: on cost accounting
Malkevitch: graph theory module on Shortest Path Problems
Malkevitch: applications involving Conic Sections
Malkevitch: on bin-packing problems
Marcus-Roberts: Analysis of Alternative Eugenics and Animal Breeding
McCarthy: on the biomial theorem
Meyer: on n-person games
O'Goody: on divisibility properties of integers
Rebman: modules on Scheduling Theory and on Voting Problems
Rockett: Line Reflections in the Cartesian Plane
Rosenfeld: on digital topology
Schindler: on counting problems
Stauffer: Computer Simulation of Forest Growth
Tornheim: Determining Age and Size of Hydrocarbon Deposits
Winkel: Number Theory and Coding Theory

Manuscripts submitted by Consortium and reviewed by Panel

Barnes: Random Walks--An Introduction to Stochastic Processes
Carlson: An Application of Mathematical Groups to Structure of Human Groups
Dancis: Perturbations--The Effects of Measurement Errors
Dancis: Design Problems
Dancis: Computerized Tomography
Gallian: An Application of the Dihedral Groups
Giordano, Wells, Wilde: Dimensional Analysis

Grimaldi: Techniques of Enumeration: The Principle of Inclusion and Exclusion (subsequently rejected)

Growney: The Rabbit Under the Bush and Other Path Problems

Kasting: Concepts of Mathematics for Business: The Mathematics of Finance

Lange: Coding and Number Theory

Max: Curves and Their Parametrization

Meyerson: The Impossibility of Trisecting Angles

Rosenberg: An Introduction to Groups

Rosenberg: Genetic Counseling

Solomon: Using Quaternions to Compose Rotations

Tuchinsky: General Equilibrium: A Leontief Economic Model

Tuchinsky: General Equilibrium: Simple Linear Models

Wittman: A Mathematical Survey of Justice

Representation of UMAP at Meetings

12/18/78	Regional MAA meeting, California (K. Rebman)
5/5/79	MAA Section Meeting, Adelphi University (J. Malkevitch)
12/1/79	New York State Two-Year College Meeting Suffolk County Community College (R. Meyer)
3/28-29/80	Wisconsin Section of MAA, Madison (P. Straffin)
Spring 1979	New York Academy of Sciences New York City (W. Meyer)
Spring 1980	New York Academy of Sciences New York City (W. Meyer)

Panel Meetings

1/5/78	Atlanta, Georgia (in conjunction with Joint Mathematics Meetings)
1/6/80	San Antonio, Texas (in conjunction with Joint Mathematics Meetings)

Outreach efforts

12 - 77	Article by Rebman appears in Newsletter of Northern California and Nevada Section of MAA

10 - 79 Mailing to 30 prospective authors

12 - 79 Two mailings (19, 40) to prospective authors

Physics Panel (December 1976 - 1980)

Initially established in December, 1976 (J. Tanner, Georgia Institute of Technology, Chair) this Panel has had several different Chairpersons: P. Signell (June-October 1977), Charles Frahm (May 1979-April 1980), and Robert Young (April 1980-present). Between the Fall of 1977 and Spring of 1978, Arnold Strassenburg (SUNY at Stony Brook and Member, UMAP Steering Committee) approached the American Association of Physics Teachers (AAPT) to nominate a Chair of the UMAP Physics Panel. Professor Frahm accepted the position of Chair of the Panel, established a Panel, initiated correspondence to solicit authorship, developed a Physics brochure (See Addendum G, page 7), and represented UMAP at the Joint Meetings of the Physics Societies in January of 1980. In the Spring of 1980, Professor Frahm assumed a position outside academia, and Professor Young assumed Chairmanship of the Panel. In addition to continuing the initiatives begun by Professor Frahm, Professor Young has reviewed several manuscripts submitted by other Panels and individual Consortium members.

Chair: James Tanner (December 1976 - June 1977)
Georgia Institute of Technology

Peter Signell (June 1977 - October 1977)
Michigan State University

Charles Frahm (May 1979 - April 1980)
Illinois State University

Robert Young (April 1980 - present)
Illinois State University

Members: William Aldridge (May 1979 - present)
Florissant Valley Community College

Materials under development by Panel

Gwinn: Introduction to Spacetime
Gwinn: Foundations of Special Relativity Theory
Gwinn: The Minkowski World
Prussing: Drag on Objects Moving Through Fluids

Materials submitted by Consortium and reviewed by Panel

Berresford: Differential Equations and Root Cellars

Boldt: Geometrical and Functional Insights Concerning the Consequences of Relativity Theory

Dancis: Perturbations--The Effects of Measurement Errors

Fink: Sturmian Sequences for Isolating Zeros of Polynomials

Giordano, Wells, Wilde: Dimensional Analysis

Hundhausen and Walsh: The Gradient and Some of Its Applications

Mathews: Bilinear Transformations

O'Neil: A Mathematical Model of a Universal Joint

Payton: monograph on mathematical physics (subsequently rejected)

Outreach efforts

9 - 79	Article by Frahm appears in AAPT Announcer
9 - 79	Outreach mailing to prospective authors (40)
12 - 79	Physics brochure developed and disseminated
12 - 80	Letter by Young soliciting manuscripts sent to members of AAPT and mailing list of American Journal of Physics Teachers
12 - 80	Abstract of UMAP presentation by Young appears in AAPT Announcer (presentation to be given at January, 1981 Joint Physics Meetings).

Political Science Panel (June 1977 - December 1980)

Under the Chairmanship of Professor G. Robert Boynton, this Panel has been highly successful in developing several modules, first in the area of dynamic political science, and most currently in the area of rational choice.

A significant feature of this Panel's activities is Professor Boynton's initiative in conducting a Shambaugh Conference in December, 1977, supported by the Shambaugh Fund. The conference participants were authors of the political science modules, and were provided with transportation, board, and a $200 honorarium.

In addition to developing modules, Professor Boynton has reviewed several manuscripts submitted by individual Consortium members, represented UMAP at regional and national professional society meetings, and written an article published in The UMAP Journal, Vol. I, Number 1, "President Ford's War on Red Tape."

Chair: G. Robert Boynton (June 1977 - present)
University of Iowa

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Members: John Aldrich (December 1978 - present)
Michigan State University

Carol Kohfeld (June 1977 - present)
University of Missouri

William Morris (June 1977 - December 1978)
University of Minnesota

Manuscripts solicited and developed by Panel

Brams: Spatial Models of Election Competition (monograph)
Brams, Davis, Straffin: The Geometry of the Arms Race
Casstevens: Exponential Models of Legislative Turnover
Enelow: Applications of Voting Theory to Congress
Harmon: The Diffusion of Innovation in Family Planning
Huckfeldt: The Dynamics of Political Mobilization: A Model of the Mobilization Process
Huckfeldt: The Dynamics of Political Mobilization: Deductive Consequences and Empirical Applications of the Model
Kohfeld: Growth of Partisan Support I and II
Likens: Budgetary Process: Competition
Likens: Budgetary Process: Incrementalism
Merrill: Multi-Candidate Voting Systems
Salert: Public Support for Presidents I and II
Smith: Nuclear Deterrence
Zinnes, Gillespie, Tahim: The Richardson Arms Race Model

Manuscripts under development by Panel

Aldrich: The Presidential Primary Game
Altfeld and DeMesquita: National Decision to Enter Wars
Balinski and Young: How Should Congress be Apportioned?
Grofman: Models of Jury Decision-Making Process: Impact of Jury Size and Jury Verdict Requirements
Lucier: Armament Procurement as Rational Adaptation
Moe: Why People Join Interest Groups
Niemi: Models of Fair Legislative Districting
Shepsle and Weingast: Rational Models of Institutional Structure
Weisberg: Voter Turnout at Elections
Wittman: Theories of Justice: A Mathematical Survey

Manuscripts submitted by Consortium and reviewed by Panel

Chase: The Numbers Game--A First Mathematical Modeling Unit
Growney: Prisoner's Dilemma

Growney: Multiperson Prisoner's Dilemma Situation
Nevison: Measure of Voting Unity
Ross: Calculus Word Problems (subsequently rejected)
Schey: The Distribution of Resources
Sherbert: Difference Equations
Uslaner: Vote Trading in Legislative Bodies

Representation of UMAP at Meetings

4/20-22/78	Midwest Political Science Association Chicago, Illinois (G.R. Boynton)
3/17-19/79	Public Choice Society Meeting Charleston, South Carolina (G.R. Boynton)
4/20-21/79	Midwest Political Science Association Chicago, Illinois (G.R. Boynton)
8/31/79	American Political Scientists Association Washington, D.C. (G.R. Boynton)
3/14-16/80	Public Choice Society Meeting San Francisco, California (G.R. Boynton)

Outreach efforts

1 - 79	Mailing to second round (rational choice) of political science authors
4 - 79	Mailing of information and materials to 350 people in political science
6 - 79	Abstracts of political science modules appear in "News for Teachers of Political Science"
4 - 80	Article appears in "News for Teachers of Political Science"

Panel Meetings

July 1976	Panel organizes first round (dynamic political science) of materials, Aspen, Colorado
12/1-3/77	Shambaugh Conference for Political Science authors, University of Iowa
12/7-8/78	Panel contacts second round (rational choice) of authors, Indiana University, Bloomington

Precalculus Mathematics Panel (November 1979 - December 1980)

Begun in November, 1979, this Panel, Chaired by Professor Peter Lindstrom, has been consistently active in soliciting and reviewing manuscripts appropriate to the Panel, reviewing manuscripts submitted by other Panels and individual Consortium members, and representing UMAP at regional and national NCTM and AMATYC meetings. The Panel has developed and produced several documents to stimulate materials development efforts:

--a two-page description of UMAP Precalculus Mathematics modules (See Addendum G, page 9) which is sent to potential authors and distributed at meetings, and

--a questionnaire on materials needs (See Addendum G, page 11) which was sent to 350 people involved with UMAP primarily from two-year and four-year colleges. Based on the responses to this questionnaire, the Panel prepared articles for inclusion in the UMAP Newsletter (See Appendix E), soliciting authorship for particular areas of development.

Professor Lindstrom is in close contact with the UMAP Office, is consistent in his analysis of the status of materials under development, and does exceptionally well in his follow-up efforts on initial contacts made by the Panel.

Chair: Peter Lindstrom (November 1979 - present)
Genesee Community College

Members: Roland Lamberson (December 1979 - present)
Humboldt State University (formerly of Des Moines Area Community College)

Richard G. Montgomery (December 1979 - present)
Southern Oregon State College

Manuscripts solicited and developed by Panel

Altinger: Evaluating Exponents and Radicals (subsequently rejected by Panel)

Boldt: Geometrical and Functional Insights Concerning the Consequences of Relativity Theory

Chamberlain: Should the Gas Guzzler Go? (subsequently rejected by Panel)

Cleaves: Problem Packets in Business

Cleaves: Problem Packets in Construction Technology

Girse: Sketching a Locus (subsequently rejected by Panel)

Kasube: Solving Word Problems (subsequently rejected by Panel)
King: The Pace of Life: Introduction to Empirical Model-Fitting
Lindstrom: Nominal and Effective Rates of Interest
Lindstrom: Some Card Tricks Solved by Elementary Algebra
Moore: Elements of Perspective Drawing for Mathematics Teachers (subsequently rejected by Panel)
Pace and Galit: Research Reliability in Experimental Social Sciences
Schmalz: Depreciation and Difference Equations
Snipes: The Language of Set Theory (subsequently rejected by Panel)

Manuscripts under developement

Carnevale: Rational Models in Management and Economics
Feldman: Consumer Price Index
Hoffman: Critical Path in Scheduling
Keating: on applications of circular functions to rotors
McGivney: Applications of Transcendental Functions
McKnabb: on generalized complex numbers
    a field extension of modulo 2
    curve fitting
    critical path analysis
    mass point geometry
Mock: on solar energy
Penna: conic sections and relationships to orbits of planets, etc.
    on conics and transformations of the plane
Ross: Mathematical Model for Tooth Replacement
Schochetman: Applications of Exponential and Logarithmic Functions
Spielman: Exploratory Data Analysis
Thayer: Mountain Campus Mathematics I
Wagner and Reitmulder: A Cash Flow Model for Magazine Subscriptions
Wheeler & Montgomery: Layout Design for Sheet Metal Fabrication

Manuscripts submitted by Consortium and reviewed by Panel

Carlson: An Application of Mathematical Groups to Structures of Human Groups
Falbo: Non-Zero Sum Games
Patten: Finding the Shortest Distance from Here to Timbuktu
Patten: Present Value of a Variable Perpetuity
Rosenberg: Linear Programming I and II
Rosenberg: An Introduction to Groups
Rosenberg: An Introduction to Symbolic Logic and Boolean Algebra

Ruckle: Series and Games: From Paradox to Paradox
Stegemoller: Trigonometric Functions
Strecker: Keeping Dimensions Straight

Representation of UMAP at Meetings

10/16-20/79	American Mathematical Association for Two-Year Colleges, San Diego, California (R. Montgomery)
4/16-19/80	National Council of Teachers of Mathematics Seattle, Washington (R. Lamberson, P. Lindstrom, R.G. Montgomery)
4/25-27/80	New York State Mathematics Association for Two-Year Colleges, Freehold, New York (P. Lindstrom)
10/10-13/80	American Mathematical Association for Two-Year Colleges, Arlington, Virginia (P. Lindstrom)

Panel Meetings

1/4/80	San Antonio, Texas (in conjunction with Joint Math Meetings)
4/16/80	Seattle, Washington (in conjunction with NCTM Meeting)

Outreach Efforts

Fall '79	Article by Leon Sagan appears in MATYC Journal (Vol. XIII, Number 3)
	Articles for *UMAP Projections*, Issues #11 (December 1979), #12 (March 1980), and #13 (June 1980).
4/8/80	Questionnaire to people from two-year colleges involved with UMAP.
6/80	Article by Bruce King appears in Two-Year College Mathematics Journal.
Summer 1980	Panel develops two-page Precalculus Mathematics information piece for dissemination.

Psychology Panel (December 1979 - December 1980)

Established in October, 1979, with Professor Ewart Thomas as Chair, the Panel conducted its initial meeting in May, 1980. The members identified the area of psychology currently represented among its membership: perception; decision-making; social interaction and jury models; testing, I.Q., and clinical; scaling; learning and motivation, learning and memory; psycholinguistics and grammars; information processing; human factors, skills, and decisions; developmental; and, neural models. They identified two areas not yet represented, but which should be included, namely: psychological testing; and clinical judgment and program evaluation. The Panel also listed the mathematical techniques they felt were most often used in psychological modeling, and then associated the techniques with areas of psychology. Each member of the Panel agreed to contact two or three people in the appropriate areas and invite them to write a module. The Panel currently has several manuscripts submitted by individual Consortium members, as well as solicited and reviewed articles submitted for publication in The UMAP Journal.

Chair: Ewart Thomas (December 1979 - present)
Stanford University

Members: William H. Batchelder (January 1980 - present)
University of California, Irvine

Jean-Claude Falmagné (January 1980 - present)
New York University

James G. Greeno (January 1980 - present)
University of Pittsburgh

Stephen Grossberg (January 1980 - present)
Boston University

Geoffrey Iverson (January 1980 - present)
New York University

Stephen W. Link (January 1980 - present)
McMaster University

James T. Townsend (January 1980 - present)
Purdue University

Brian Wandell (May 1980 - present)
Stanford University

J. Frank Yates (January 1980 - present)
University of Michigan

Materials Under Development by Panel

Batchelder: Rating Systems for Human Abilities: The Case of Rating Chess Skill

Falmagné: Some Applications of Functional Equations in Modeling Psychological Phenomena

Greeno: Production Systems and Basic Problem Solving
Grossberg: Why Do Cells Compete? Some Examples for Visual Perception
Grossberg: Transmitters, Expectancies, Extinction, and Avoidance
Iverson: Recall from Memory
Link: Crime vs. Punishment
Thomas: Expectancy and Simple Reaction Time
Townsend: Serial vs. Parallel Processing
Wandell: On Mathematics of Color Vision
Yates: Subjective Probability Scoring Rules

Materials Submitted by Consortium and reviewed by Panel

King: Pace of Life: An Introduction to Empirical Model-Fitting
Pace and Galit: Research Reliability in Experimental Social Science
Smith: Descriptive Models for Perception of Optical Illusions

Panel Meetings

5/23 - 24/80 Stanford University

Statistics Panel (December 1977 - December 1980)

This Panel is responsible, not only for the development of several modules solicited by its members, but for reviewing several manuscripts that incorporate probability and statistics submitted by other Panels and individual Consortium members. In addition, the Panel has represented UMAP at national professional society meetings, and has developed documents to stimulate materials development efforts:

-- a Statistics Panel Goals and Activities Statement (see Addendum G, page 13) to potential authors and reviewers, and distributed at meetings, and

-- a background information form (see Addendum G, page 15) for potential peer reviewers in the area of statistics.

An adaptation of the Goals and Activities Statement was published as an article in the Fall, 1979 issue of AmStat News.

Professor Zahn resigned as Chair in April, 1980, and has remained a Panel member. At the suggestion of Panel members and at the invitation of the Project Office, Professor Thomas R. Knapp assumed Chairmanship of the Panel in June, 1980. Professor Knapp is in close contact with the Project Office and offers a consistent, organized management of the Panel activities. Professor

Knapp has not only reviewed several manuscripts sent to him by the Project Office, and coordinated the review process of additional manuscripts, but has provided thorough reviews of articles submitted for publication in The UMAP Journal.

Chair: Douglas A. Zahn (December 1977 - April 1980)
Florida State University

Thomas R. Knapp (June 1980 - present)
University of Rochester

Members: Roger Carlson (August 1978 - present)
University of Missouri

J. Richard Elliot (October 1980 - present)
Wilfrid Laurier University

Earl Faulkner (August 1978 - present)
Brigham Young University

David Herr (October 1980 - present)
University of North Carolina, Greensboro

Peter Holmes (October 1980 - present)
University of Sheffield

Peter Purdue (August 1980 - present)
University of Kentucky

Judith Tanur (August 1978 - present)
State University of New York, Stony Brook

Maurice Tatsuoka (October 1980 - present)
University of Illinois

Richard Walker (August 1978 - present)
Mansfield State College
(on leave at U.S. Census Bureau, 1980 - 1981)

Douglas A. Zahn (April 1980 - present)
Florida State Univerity

Advisory Committee:

Donald Guthrie (August 1978 - present)
University of California, Los Angeles

Brian Joiner (August 1978 - present)
University of Wisconsin

Frederick Mosteller (August 1978 - present)
Harvard University

Manuscripts Solicited and Developed by Panel

Carlson: Conditional Probability and Ambiguous Information
Guthrie and Service: Approximations in Probability Calculations
Kleinbaum and Kleinbaum: Adjusted Rate - Direct Rate
Knapp: Regression Toward the Mean
Walker: Basic Descriptive Statistics

Manuscripts Under Development by Panel

Edgington: Randomization Tests
Gotter: 3 units on non-parametric statistics
Gotter: 3 units on nature of probability
Knapp: t-Test for Independent Samples
Lee: A Computerized Demonstration of the Central Limit Theorem in Statistics
Purdue: Common Models for Uncommon Situations
Rosenthal and Zahn: Power Analysis
Rosenthal and Zahn: Blocking
Rosenthal and Zahn: Contrasts
Rosenthal and Zahn: Interaction Effects
Rosenthal and Zahn: Incomplete Factorial Designs
Rosenthal and Zahn: Iterative Approach to Linear Regression

Manuscripts Submitted by Consortium and Reviewed by Panel

Alexander: Measures of Association
Bedian: Statistical Evaluation of Clinical Tests
Berresford: Random Walks and Fluctuations
Cooke: several units on Computer Simulation
Cornell et al: Statistical Evaluation of Burn Care
Duthie: The Six-Arrow Game (subsequently rejected)
Fiegl: Sample Size Determination
Growney: Parable of the Watchmaker
Hoffman: Monte Carlo: The Use of Random Digits to Simulate Experiments
Lamm: Fitting Equations to Data
Lindstrom: Some Card Tricks Solved by Elementary Algebra
LoBello: Applications of Mathematics to Textual Criticism and Linguistics
Luttman: The Poisson Distribution Process
Marcus-Roberts: Why Are Data Normally Distributed?
Marcus-Roberts: Analysis of Alternate Eugenics and Animal Breeding
Meyer: Blood Reticulocytes (subsequently rejected)
Nash: on linear regression (subsequently rejected)
Nordstrom: Simplex Method

Nordstrom: Extensions of Simplex Algorithms
Nordstrom: Postoptimality Analysis
Pace and Galit: Research Reliability in Experimental Social Science
Rosenberg: Genetic Counseling

Representation of UMAP at Meetings

3/22-24/78	Eastern Regional Section of American Statistical Association (D. Zahn)
8/14-17/78	Joint Statistics Meeting, San Diego, California (D. Zahn and Panel)
9/29-30/78	Miami University Conference on Applications of Statistics and Mathematics, Oxford, Ohio (D. Zahn)
8/13-16/79	American Statistical Association, Washington, D.C. (D. Zahn and Panel)
8/11-14/80	American Statistical Association, Houston, Texas (T. Knapp and Panel)

Panel Meetings

8/14/78	San Diego, California (in conjunction with Joint Statistics Meetngs)
3/30-31/79	Education Development Center, Newton, Massachusetts
8/13/79	Washington, D.C. (in conjunction with American Statistical Association Meeting)

Outreach Efforts

4 - 79	Prepared Statistics Panel Goals and Activities Statement for dissemination
4 - 79	Outreach to members of Committee on Minorities in Statistics (17)
4 - 79	Revised background information form for statistics reviewers
6 - 79	Letter to potential reviewers (17)
6 - 79	Outreach mailing to potential authors (36)

Monograph Editorial Board

The Monograph Editorial Board, established in November, 1976, is responsible for suggesting topics for expository monographs, inviting authors to submit monographs, and reviewing submitted monographs or identifying appropriate reviewers for monographs. Under the Chairmanship of Robert M. Thrall (November 1976 - September 1979), the Board developed a two-page description of the UMAP Monograph Series (see Addendum G, page 16-17). Professor Thrall developed a series of letters used to contact authors and referees for monographs.

Professor Thrall resigned as Chair of the Board in September 1979, and remains as a member of the Board. He suggested that Professor Clayton Aucoin be invited to assume the Chairmanship, and Professor Aucoin did so in September, 1979. As well as following through on the initiatives begun by Professor Thrall, Professor Aucoin has called his first meeting of the Board to take place in January, 1981. At this meeting, the Board will carefully examine the manuscripts in the system, identify some areas that should be under development, and discuss materials needs and marketing questions.

Chair:	Robert M. Thrall (November 1976 - September 1979) Rice University
	Clayton Aucoin (September 1979 - present) Clemson University
Members:	William Boyce (October 1980 - present) Rensselaer Polytechnic Institute
	James Frauenthal (November 1976 - present) State University of New York, Stony Brook
	Helen Marcus-Roberts (November 1976 - present) Montclair State College
	Marcel Neuts (October 1980 - present) University of Delaware, Newark
	Ben Noble (November 1976 - October 1980) University of Wisconsin, Madison
	Paul Rosenbloom (November 1976 - October 1980) Columbia University
	Robert M. Thrall (September 1979 - present) Rice University
	Carroll O. Wilde (October 1980 - present) Naval Postgraduate School

NOTE: The Chairs of the Subject Matter Panels are ex-officio members of the Monograph Editorial Board. They are asked to react to manuscripts submitted relative to their particular fields.

Monographs Developed:

Brams: Spatial Models of Election Competition
Cline: Elements of the Theory of Generalized Inverses for Matrices
Frauenthal: Introduction to Population Modeling
Pfeiffer: Conditional Independence in Applied Probability
Straffin: Topics in the Theory of Voting

Monographs Under Development

Barrett: Analytical Solutions for the Optimization of Rocket Trajectories
Beltrami: Model for Water Quality Management (3)
Beltrami: Model for Land Use Development
Beltrami: An Energy Supply and Demand Model
Beltrami: Stochastic Model for the Allocation of Fire Companies
Casstevens: Circulation of Elites
Ford and Fuente: Porous Media Problems
Frauenthal: Water Resource Planning Model
Frauenthal: Smallpox: When Should Vaccination by Discontinued?
Galluci et al: material on Physical Processes in Terrestial and Aquatic Ecosystems
Geist: Point Set Theory
Glick: Breaking Records and Breaking Boards
Greenspan: A Short Introduction to Numerical Methods
Haight: Analytic Introduction to Projective Geometry
Hindin: Theory and Applications of the Poisson Transforms
Hoffman: Invariance, Lie Groups, and Differential Equations
Hundhausen and Walsh: Complex Variable Solutions to Steady Heat Conduction Problems
Katz: Numerical Analysis: Optimization and Optimal Facility Location
Kazarinoff: Solutions of Systems of Autonomous Nonlinear Ordinary Differential Equations
Kohfeld and Salert: When a Difference Makes a Difference
Lakshmikantham and Leela: A Dynamic Approach to Elementary Differential Equations
Lucas: Fair Division
Pinsky: on Applied Analysis

Rosenbloom: An Elementary Introduction to the Fourier Transformation

Saaty and Mora: Algorithms in Graph Theory

Snell: Putting the Drunkard's Walk to Work

Thie: Markov Decision Processes

Tsokos and Tsokos: Introduction to Pharmocokinetic Systems

Tuchinsky: Man in Competition with the Spruce Budworm

White: Data Analysis for Finite Markov Chains

Willett: Algebraic Coding Theory

Willis: Introduction to Combat Modeling

Windholz: Numerical Inversion of Fourier Transforms

Wohl: Introduction to Solution to Differential Equations

Wolff: Analytic Photogammetry

Yoshida: Precalculus and Calculus Mathematics in Radiology

Monographs Submitted, Reviewed by Board, Rejected

Cohen: on Solar Energy

Demp: A Mathematical Taxonomy to Evaluate the Biochemical Quality of the Human Foot

Meyer: Some Existence, Uniqueness, and Convergence Relationships in Probability

Nagel: Finding an Optimal Policy Level: Pretrial Jailing as an Illustration

Payton: Mathematical Physics with Cosmology and Computer Simulations

Sklar: Algebraic Coding Theory

Content Development and Coordination Committee
(June 1977 - present)

The coherence of the UMAP instructional materials is the responsibility of the Standing Committee on Content Development and Coordination, with William F. Lucas as Chair. At their annual meetings, the Committee examines the existing inventory of materials, suggests areas for further development, and discusses mechanisms for coordinating materials development efforts of the Panels and the Monograph Editorial Board. A summary of the discussions conducted by the Committee follows the identification of Chair and Members.

Chair: William F. Lucas (June 1977 - present)
Cornell University

Members: Michael Anbar (June 1978 - October 1980)
State University of New York, Buffalo

Clayton Aucoin (September 1979 - present)
Clemson University

G. Robert Boynton (June 1977 - present)
University of Iowa

Gerald Egerer (October 1979 - present)
Sonoma State University

Charles Frahm (May 1979 - present)
Illinois State University

Vincent Galluci (October 1980 - present)
University of Washington, Seattle

Thomas R. Knapp (June 1980 - present)
University of Rochester

Peter Lindstrom (November 1979 - present)
Genesee Community College

Walter Meyer (September 1979 - present)
Adelphi University

Kenneth R. Rebman (June 1977 - August 1979)
California State University, Hayward

Peter Signell (June 1977 - October 1977)
Michigan State University

Ewart Thomas (December 1979 - present)
Stanford University

Robert M. Thrall (November 1976 - September 1979)
Rice University

Carroll O. Wilde (July 1977 - present)
Naval Postgraduate School

Robert Young (April 1980 - present)
Illinois State University

Douglas A. Zahn (December 1977 - April 1980)
Florida State University

Meeting: June 16-17, 1977

At its initial meeting, the Committee examined those modules under development, identified gaps in the inventory, and discussed areas of materials development appropriate for each Subject Matter Panel. As a result of this meeting, Panels prepared priority module lists to use as a guide in soliciting authors.

Meeting: November 11, 1978

As the Chair of each Panel offered status reports on the progress of the Panel, issues arose that were of common concern to the participants. These issues included:

--maintenance of communications among Panel members themselves, and with the authors and reviewers a Panel had engaged;

--lack of on-site resources to help with this communication;

--need for more correlation and sharing of information among Panels, and among the Panels and the Monograph Editorial Board.

Overall, it was agreed that the Project Central Office would more actively assist each Chairperson in ways each saw most helpful. For example, the Central Office is prepared to initiate correspondence on behalf of a Chairman, to oversee the reviews of manuscripts submitted by a Panel, to write reminder letters to authors and/or reviewers if manuscripts are moving slowly, etc.

In accordance with Thrall's suggestion, all Chairs will be sent abstracts of potential monographs for their perusal and reaction. The Chairs will also receive periodic up-dates of the total UMAP inventory so they can make a continuing assessment of what materials are developing.

Meeting: September 29 -30, 1979

Each Chair reported on the progress and activities of the respective Panel. To summarize,

Analysis and Computation: Wilde highlighted the diversity of expertise represented on the Panel, reported on the beneficial interactions with the Statistics Panel and described plans to interact with the Physics Panel.

Political Science: Boynton reported that most of the modules developed in dynamic political science were being field-tested, and that manuscripts in the area of rational choice were developing. Boynton perceives a third wave of materials in which statistical data is incorporated into some previously-developed materials.

Statistics: Zahn described the Panel's commitment to developing basic statistics materials that respond to the needs of those who use statistics in various courses. The Panel feels strongly about making input into those manuscripts that touch on statistics, no matter the source of the manuscript.

Finite Mathematics: Meyer (having recently assumed Chairmanship of the Panel) has made initial inquiries about getting involved with industry, and plans to extend the membership of the Panel in order to generate additional manuscripts.

Physics: Frahm (having recently become Chair of the Panel) is beginning to solicit Panel membership, and has sent information and UMAP materials to approximately seventy people, inviting them to become involved as authors.

Monograph Editorial Board: Aucoin, recently assuming the Chair of the Board, is studying the monograph files given to him by Thrall. Aucoin commented that the manuscripts submitted by SUNY, Stony Brook and the University of Washington, Seattle, should enhance the monograph series.

Meeting: January 5, 1980

Lucas offered some introductory remarks on the Subject Matter Panels, established to generate and coordinate the development of materials in their respective areas. Compared to the number of manuscripts generated on an individual basis, Panel generation of materials has been slow. He suggested that each of the Panels initiate a list of materials that should be developed, and that this information be publicized in the UMAP Newsletter, with invitations for people to become involved as authors. He invited each of the Chairpersons to report on Panel progress and activities. To summarize, Statistics: Zahn reported that the Panel had identified areas for materials development, contacted people in statistics and other fields to generate the manuscripts, and each Panel member shares the responsibility for overseeing the development of some number of the materials. The Panel has also participated in professional meetings of the American Statistical Association and tried to make people aware of UMAP.

Finite Mathematics: Meyer reported that, since assuming leadership of the Panel at the end of September (1979), he has been building up its membership. He intends to conduct panel activities by correspondence and telephone, rather than meeting as a group. When members of the Panel attend professional society meetings, however, he will meet with whomever is available. The stimulation of materials development is the Panel's top priority.

Physics: Frahm, who also assumed leadership of the Panel in September (1979), reported that he was establishing Panel membership. Letters and UMAP materials have been sent to seventy people to generate some interest. In response to an article he prepared for the AAPT Announcer (American Association of Physics Teachers), he had a list of some people who are interested in writing, and had received one preliminary manuscript. Frahm said that there seems to be a demand for remedial/tutorial type modules, and predicted that the Panel would move in that direction in generating materials.

Psychology: Thomas had just assumed Chairmanship of the Panel in December, and reported that he was putting together a Panel.

Economics: Egerer assumed Chairmanship of the Panel at the end of October (1979) and reported on the preliminary contacts he had made with a view to establishing its membership. In addition, he had contacted three economists of great distinction, who had agreed to make their advice and help available to the Panel on an informal basis, namely: Kenneth Boulding, University of Colorado, and current President of AAAS; Richard Lipsey, Yale University, and author of Applications of Mathematics to Economics; and William Baumol, President-Elect of the American Economic Association. Egerer expressed the hope that the materials to be developed by the Panel would contribute to reducing the current split in the teaching of undergraduate economics between courses requiring, and those not requiring, the application of the calculus and matrix algebra.

Political Science: Boynton reported that he and his Panel had completed a first round of materials in dynamic political science, and had begun developing a second round in the area of rational choice, two or three of which would soon be available.

Precalculus Mathematics: Lindstrom reported on the meeting he had had with his Panel. They are primarily concerned with finding out specific needs for precalculus materials and then finding potential authors.

Monograph Editorial Board: Aucoin briefly described his activities in coordinating the development of monographs, and pointed out that a manuscript on the New York City fire delivery service (Beltrami) would be submitted soon, as well as a monograph by Frauenthal on small pox vaccination.

The participants discussed the issue of audience for the materials: Are they written primarily for mathematics students or for students in the applied fields? Garfunkel pointed out that materials geared toward students in applied fields will be used also by mathematics students. The distinction is not as critical in practice as it is in theory. All the materials are reviewed by people in mathematics and in the appropriate applied fields.

In closing, Lucas suggested that each Chairperson identify materials that need to be developed and submit titles and abstracts to the UMAP central office. UMAP, in turn, can place these descriptions in the UMAP Newsletter and invite people to write these needed materials.

Education Development Center

Education Development Center, Inc. (EDC), is a large publicly supported nonprofit corporation engaged in educational research and development. Founded in 1958 to administer the development of the PSSC high school physics curriculum, EDC has become a leading center for materials, program, and institutional development in the U.S. and abroad. There are currently over 20 projects within EDC, each with its own director, staff, and funding. These projects are clustered into four program areas (Continuing Education, International, Quantitative Skills, School and Society Programs) and are supported by a group of centralized services (offices of the president, the treasurer, and the administrative counsel; project development; accounting; audio-visual production; distribution; reproduction).

Since its inception, EDC has received over $150 million in contracts and grants from local state, federal, and international agencies, private foundations and organizations, and foreign governments. A major factor in EDC's effectiveness and longevity is its ability to respond to a particular need by joining standing staff capability in research and evaluation, project design and planning, materials development, training and technical assistance, dissemination and distribution, and program management with the necessary range of content expertise and perspectives. Over the years, EDC has developed extensive networks of contact among schools, universities, community agencies, and professional associations, which it can easily tap for substantive input, professional advice and review, collaboration, and field testing and dissemination. (See Appendix K for the latest EDC Annual Report.)

CONSORTIUM DEVELOPMENT

During the past four years, UMAP has developed instructional modules and monographs from which students may learn applications of undergraduate mathematics. But UMAP's goal is not simply to produce a fixed collection of curriculum materials. It is clear that no single set of materials could ever suffice to encompass the changing undergraduate mathematics and applications curricula. Rather, the goal of UMAP is to provide a means for the continued production of innovative materials and a forum for the sharing of ideas and experiences through the support of the educational community. Toward this end, we have established the UMAP Consortium.

Goals

The goals for the establishment of a self-sustaining Consortium are:

--the achievement of maximum input and participation of the mathematics and mathematics user communities in the production, review, and dissemination of modules and monographs; and

--the assurance that both the development and use of these materials continues after the expiration of NSF funding.

Consortium activities focus on extending the UMAP development and communications effort, strengthening the base of Consortium support, and formulating a managerial plan for future Consortium operations.

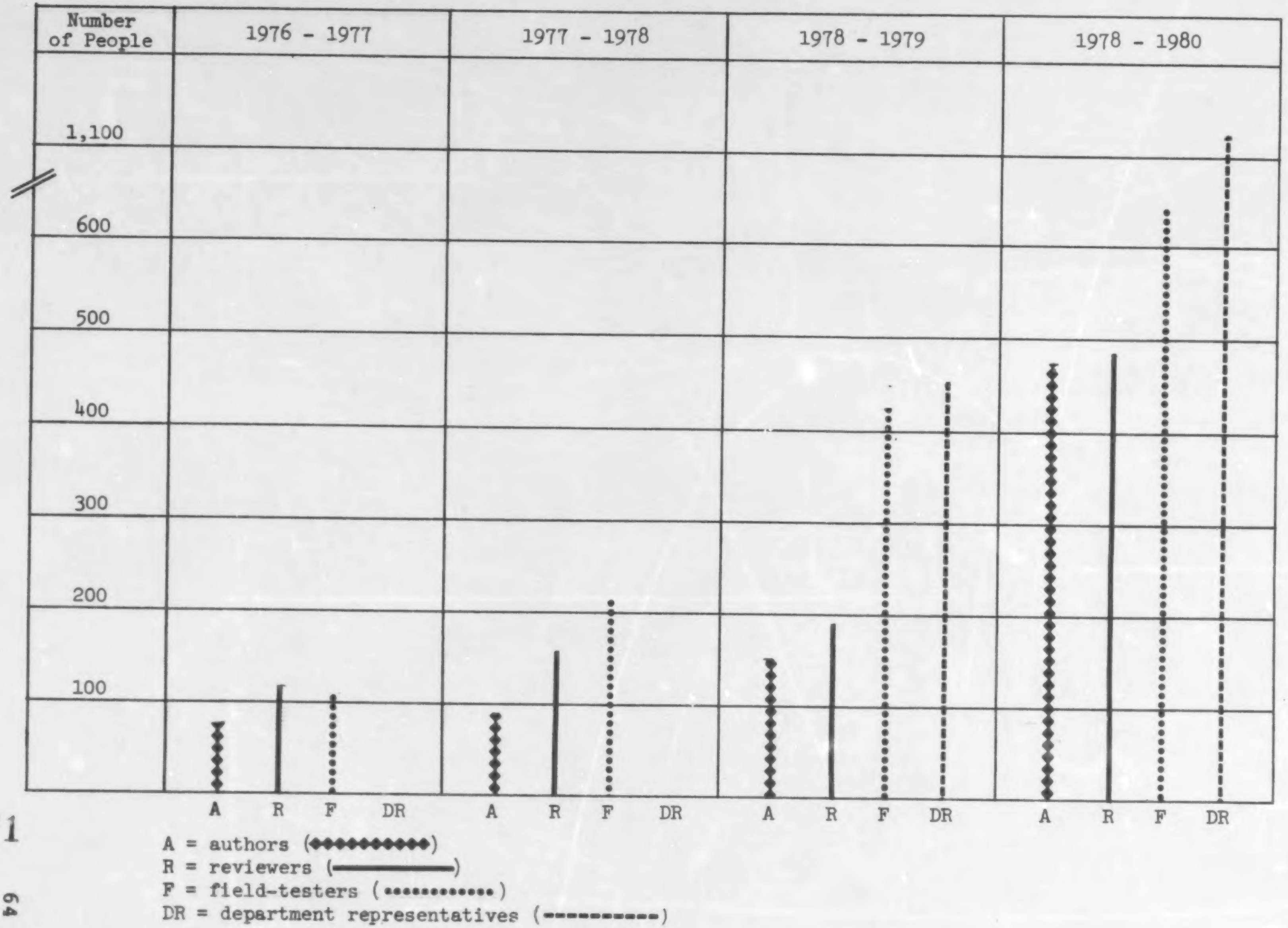
The Nature of the Consortium

The Consortium is currently a cross-disciplinary organization of individual members. Members include those actively involved as authors, reviewers, field-testers, student-review advisors, and department representatives, as well as individuals serving on the UMAP Steering Committee, Consortium Council, Subject Matter Panels, and Monograph Editorial Board. As of December, 1980, this membership has grown to more than 2500 persons, including 450 authors, 462 reviewers, and 657 field-testers. (See Chart III on the following page.)

In March, 1979, a letter was sent to more than 2,000 mathematics department chairpersons throughout the country, informing them about UMAP and inviting them to designate a department representative to UMAP. As of December, 1980, there are 1,122 department representatives to UMAP from 365 universities, 436

CHART III:

CONSORTIUM DEVELOPMENT



four-year colleges, 275 two-year colleges, 9 high schools, and 3 other institutions. (See The UMAP Directory, Appendix H, for a complete list of Consortium members.) The department representatives serve as liaison between UMAP and their institutions, and are an important resource for the Consortium.

Initial letters written to, and on behalf of, department representatives are found on the following pages:

--acknowledgement letter to designated department representatives, and
--letter to dean or department chairperson acknowledging department representative to UMAP.

Periodic letters offering up-dated information to department representatives are found in Appendix L.

Incorporation

As of this writing, UMAP has applied for incorporation and tax-exempt status from the State of Massachusetts and the Internal Revenue Service. The name of the corporation will be Consortium for Mathematics and Its Applications, or COMAP. The Consortium will be governed by a Board of Trustees who will have fiscal responsibility, and a Consortium Council who will have responsibility for program and policy decisions. Incorporation of the Consortium will give us the advantage and flexibility to operate as an independent body. The most immediate tasks of the Consortium include:

--establishing an operating governing structure,
--clarifying by-laws,
--pursuing possible locations for the Consortium,
--initiating paid memberships (individual and institutional), and
--monitoring the impact of the commercial publication and distribution of UMAP materials (modules, monographs, The UMAP Journal) by Birkhauser Boston, Inc.

December , 1980

Dear :

I would like to express my appreciation for your interest in UMAP and welcome you as a department representative to the UMAP Consortium. As a representative you will receive the UMAP newsletter and periodic updates on materials available for review, field-testing, and general distribution. To the extent possible we would appreciate your keeping interested members of your department aware of UMAP materials and events. We feel that your liaison activities will play a large part in increasing the use and awareness of innovative curriculum materials. If there is any way that I or other members of the project staff can be of particular assistance please do not hesitate to write or call.

Sincerely yours,

Solomon Garfunkel
Consortium Coordinator

SG/pms

P.S. I am enclosing up-dated information on Consortium developments. You will receive periodic memoranda to keep you up-to-date.

Dear :

(name) of your (faculty, department) serves as a representative to UMAP, and I am writing to express my appreciation, and that of my colleagues, for (his/her) involvement.

The goal of UMAP is to develop, through a community of users and developers, a system of instructional modules in undergraduate mathematics and its applications which may be used to supplement existing courses and from which complete courses may eventually be built. The Project is funded by a grant from the National Science Foundation to Education Development Center, Inc., and is guided by a National Steering Committee of mathematicians, scientists and educators.

There are currently more than 1,050 department representatives to UMAP throughout the country in universities, four-year and two-year colleges. Representatives act as liaison between UMAP and their departments, and are an important resource of the UMAP Consortium. The Consortium is a cross-disciplinary organization of individuals involved with UMAP, and the long-term goal is to formalize the organization into a self-standing legal group to continue the work of UMAP upon termination of NSF funding.

Your contribution to this endeavor by encouraging and recognizing your representative's involvement is greatly appreciated.

Sincerely,

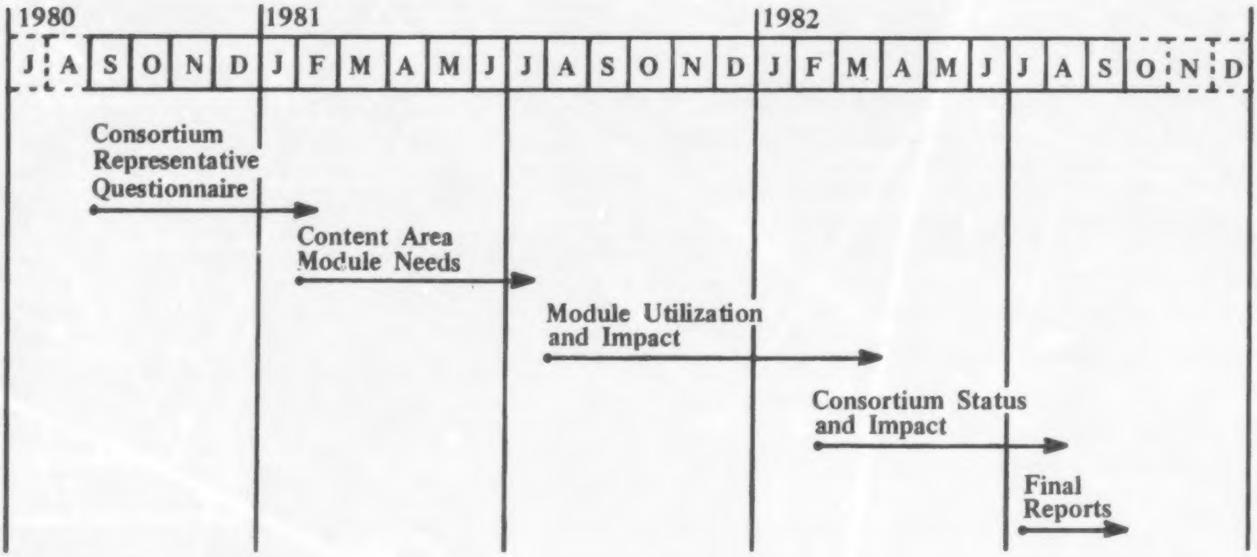
Solomon A. Garfunkel
Consortium Director

SAG/pms

FORMATIVE EVALUATION

The Project activities focus on the development of instructional materials and on developing a cross-disciplinary Consortium to provide broadly-based input, disseminate finished units, and provide for the continued development, formative evaluation, and use of the materials after the grant period. UMAP has developed instruments (See Appendix M) to collect data on the development of instructional materials: peer-review forms, student-review forms, and field-test forms for instructors and students. UMAP also collects data on use of materials in the classroom (location of field-test sites and titles and nature of courses in which particular UMAP units are used), the growth of Consortium membership, and on the strategies of operation of various UMAP panels and committees.

In addition to the Project's own data collection efforts, an evaluation is being conducted by Professor Marcus Lieberman and Mr. Edward De Vos of Harvard University. As a first step in the process, and in recognition of the complexity of the Project, the evaluators proposed the following framework:


1980
1981
1982
J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
Consortium Representative Questionnaire
Content Area Module Needs
Module Utilization and Impact
Consortium Status and Impact
Final Reports

With this framework as a guide, the evaluators submitted a list of potential evaluation questions to the Project staff for consideration (See Appendix N, Part 1). The Project advised that, of the components which could be investigated, it was of primary importance to look at the developing Consortium. The purpose was to:

- --identify the Consortium's constituency,
- --evaluate the effectiveness of different outreach techniques,
- --identify the distribution of activities among sub-groups,
- --plan for future outreach efforts, and
- --consider issues of future viability.

The evaluators developed a questionnaire which was mailed to the Consortium membership during the spring, 1979 (See Appendix N, Part 2). Consortium members included authors, field-testers, panel/committee members, reviewers, student review advisors, and materials users. The mathematics department representatives were not surveyed at this time since they had not yet been recruited. A summary report of that survey may be found in Appendix N, Part 3.

The survey results indicated, among other things, that two-year colleges were under-represented, and further, that members from two-year colleges were disproportionately less likely to be authors or members of panels or committees. This suggested that remediation could not be left to the "natural" evolution of the Consortium. It would require active intervention to induce and promote two-year college membership and involvement. This might well be accomplished if more modules relevant to the first two years of college existed. To this end, and to reflect the needs of the larger user community, a Precalculus Mathematics Panel was formed to generate and develop such materials.

In the fall of 1980, the evaluation team met with the Project staff to discuss the development of a questionnaire to be sent to current Consortium members. (Current Consortium members -- approximately 2,500 --includes those individuals involved as materials developers and users, panel and committee members, and department representatives.) A preliminary draft of the questionnaire was sent to the Executive Committee of the National Steering Committee for their reactions, and a second draft was discussed by the Steering Committee at the Fall, 1980 meeting.

The evaluators incorporated the suggestions submitted by the Steering Committee and Project staff, and the questionnaire (See Appendix O, Part 1) was distributed in early November, 1980. As of this writing, more than 200 responses to the questionnaire had been returned. A summary of the responses to the questionnaire is found in Appendix O, Part 2.

The UMAP office finds the evaluation team a very helpful resource for the central staff. While we are engaged in the daily operations of the Project, we feel a need to have people whose expertise lies in evaluation to develop and distribute instruments that result in offering objective, scientific data on Project and Consortium aspects.

CENTRAL STAFF

In overall terms, the central staff is responsible for carrying out the daily operations to ensure success of the Project and the ultimate establishment of a self-sustaining Consortium. (See Addendum H for list of personnel on Project staff.) The staff engages in:

1) activities geared toward outreach and expansion of the Consortium network,
2) supporting this network, as it develops, with materials production, coordination and communications services, and
3) observing and documenting the Project's internal and external processes, conducting formative evaluation, and reporting regularly to the National Science Foundation on the results of this ongoing procedure.

Specifically, staff activities are distributed in the following manner.

Professional Staff:

Project Director and Consortium Director: Project direction and administration. Primary contacts with Steering Committee, NSF, authors, reviewers, field-testers, Consortium members. Primarily responsible for program and policy decisions and for Project development. Establishment of and subsequent interaction with Subject Matter Panels and Monograph Editorial Board. Primary contacts with Content Development and Coordination Committee and Consortium Council.

Associate Director for Administration: responsible for management, personnel matters, staff work loads. Works closely with Directors in establishing and implementing program and policy decisions. Maintains budget status, coordinates outreach efforts, prepares status reports to National Science Foundation, prepares documentation of meetings. Coordinates communications with peer- and student-reviewers and field-testers.

Coordinator for Materials Production: oversees work of manuscript typist, provides copy editing, proofing, formatting/layout and maintains manuscript originals. Coordinates production of newsletters, brochures, and other public information materials. Coordinates local representation of UMAP at professional meetings.

Support Staff

Assistant to the Directors: processes financial transactions (payment vouchers, expense vouchers, purchase requisitions, petty cash). Initiates and types correspondence to people who express interest in UMAP. Coordinates field-test effort, maintains personnel files and weekly/monthly time sheets, types budgets, and prepares periodic reports on the distribution of materials, keeps records of requests for UMAP materials.

Project Secretary/Production Assistant: distributes incoming mail, types correspondence for administrative staff, maintains master files for correspondence and manuscript production, maintains master mailing list of people actively involved in UMAP, assists in typing reports. Assists in producing graphics and lay-out of instructional and public information materials.

Word-Processor Technician: (part-time) enters instructional modules, expository monographs, copy for The UMAP Journal, reports, and other public information documents on the word-processor. Does initial proof-reading and final print-out of instructional and public information materials.

Staff Assistant: (part-time) compiles and mails modules for field-testing; maintains inventory of materials; compiles and ships materials for display at regional and national meetings; photocopies documents for distribution.

CONCLUSION

With the support of the National Science Foundation, and with the advice and involvement of groups of people closely affiliated with the Project (Steering Committee, Consortium Council, Subject Matter Panels and Monograph Editorial Board), the first four years of UMAP have been characterized by the following achievements:

--the development and dissemination of instructional materials that serve the needs of undergraduate students and instructional staff across the country,

--the establishment and implementation of a materials development system that incorporates the talents and expertise of hundreds of people committed to the improvement of mathematics/applications instruction,

--the commercial publication and distribution by Birkhauser Boston, Inc., of The UMAP Journal, and of those modules and monographs that have gone through appropriate stages of development,

--the cooperation of the Mathematical Association of America (MAA) and the Society for Industrial and Applied Mathematics (SIAM) in the publication of The UMAP Journal, and

--the evolution of the Consortium (the body of people involved as authors, reviewers, field-testers, department representatives, and Panel and Committee chairpersons and members) as an active and recognizable force in mathematics education.

UMAP must now build upon its achievements and move forward as the Consortium for Mathematics and Its Applications (COMAP). Some of the immediate and long-term challenges that face UMAP include:

--improving strategies, not only for materials development, but for gathering and sharing information on the use of modular materials in the classroom,

--in conjunction with the Subject Matter Panels and the Monograph Editorial Board, more aggressively extending our involvement into the applied communities, so that COMAP evolves into a viable multidisciplinary organization,

--initiating individual and institutional memberships into the Consortium, and

--developing designs for future efforts of COMAP, which are natural extensions of UMAP, in order to ensure our continuation as an organization that serves the perceived instructional needs in mathematics and its applications.

In developing areas for future involvement, while at the same time examining current efforts that need improvement, the thrust remains our commitment to excel as a service organization--one which anticipates, pays attention to, and responds to the mathematics education needs of our various constituencies.

ADDENDA TO UMAP FINAL REPORT
1976 - 1980

CHRONOLOGY OF EVENTS A

SAMPLE LETTERS TO MATERIALS DEVELOPERS B

MEMBERS: THE UMAP JOURNAL EDITORIAL BOARD C

LIST OF PUBLICATIONS D

MEMBERS: NATIONAL STEERING COMMITTEE E

MEMBERS: CONSORTIUM COUNCIL F

INFORMATION MATERIALS: SUBJECT MATTER PANELS G

MEMBERS: UMAP CENTRAL STAFF H

ADDENDUM A

CHRONOLOGY OF EVENTS
JULY, 1976 - DECEMBER, 1980

JULY - DECEMBER 1976

JULY

UMAP begins
Office staff selected

19 Initial contact with MAA* regarding collaboration on conducting a survey of available mathematics modules

29-30 Meeting: UMAP Steering Committee (Chair: W.T. Martin, Massachusetts Institute of Technology)

AUGUST

26-28 AMS**/MAA Joint Mathematics Meetings, Toronto

OCTOBER

13 Meeting: Biology Panel (Chair: Robert Tamarin, Boston University)

15 Meeting: Task Force on module format and authors manual (Chair: Donald Kerr, Indiana University)

16 Meeting: Executive Committee of Steering Committee (Chair: W.T. Martin)

NOVEMBER

5-6 Meeting: Monograph Editorial Board (Chair: Robert Thrall, Rice University)

15 UMAP/MAA survey on available mathematics modules mailed

21 Meeting: Chair of Analysis Panel (Howard Resnikoff, University of California, Irvine) with Project staff

DECEMBER

— Issue #1 of UMAP newsletter mailed (2,500 people)

— Physics Panel established (Chair: James Tanner, Georgia Institute of Technology)

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*Mathematical Association of America
**American Mathematical Association

JANUARY - JUNE 1977

JANUARY

29-30 AMS/MAA Joint Mathematics Meetings, St. Louis, Missouri
--First general Consortium meeting
--Meeting: Task Force on role of MAA and other professional societies

FEBRUARY

6-7 Meeting: UMAP Steering Committee (Chair: W.T. Martin)

MARCH

— UMAP Authors Manual produced

26-27 Meeting: Consortium Committee (Chair: Solomon Garfunkel, University of Connecticut, Storrs)

APRIL

— Issue #2 of UMAP newsletter mailed (2,500 people)

MAY

— Resnikoff resigns as Chair of Analysis Panel. Carroll O. Wilde (Naval Postgraduate School) assumes Chairmanship of Analysis and Computation Panel.

JUNE

— Index and Descriptions of Available Mathematics Modules produced.

— Finite Mathematics Panel established (Chair: Kenneth R. Rebman, University of California, Hayward)

— Political Science Panel established (Chair: G. Robert Boynton, University of Iowa)

— Tanner resigns as Chair of Physics Panel. Peter Signell (Michigan State University) assumes Chairmanship of Physics Panel.

13-15 Meeting: Society of Industrial and Applied Mathematics (SIAM), Philadelphia, Pennsylvania
--Ross L. Finney (Senior Mathematics Editor, UMAP), Robert M. Thrall, and Nancy Kopell (Northeastern University) represent UMAP at Education Committee meeting.

16-17 Meeting: Content Development and Coordination Committee (Chair: William F. Lucas, Cornell University)

JULY - DECEMBER 1977

JULY

— UMAP central staff adds positions: Associate Director for Administration (Felicia DeMay) and Administrative Assistant (Paula M. Santillo). Barbara Kelczewski hired as Coordinator for Materials Production.

18 Site visit to Project: Arnold Strassenburg and James Mulder (National Science Foundation)

AUGUST

— Meeting: Education Committee of American Statistical Association. William U. Walton, Project Director, and Peter Signell represent UMAP.

9 Summer workshop on applications of mathematics, Columbia University Teachers College. Ross L. Finney represents UMAP.

13-18 AMS/MAA Joint Mathematics Meetings, Seattle, Washington --Solomon Garfunkel represents UMAP.

SEPTEMBER

— Project Director, William U. Walton, resigns. Joseph Stavenhagen, President of EDC, and W.T. Martin recommend to the UMAP Steering Committee that Ross L. Finney be nominated Project Director.

16 Meeting: UMAP Steering Committee (Chair: W.T. Martin). Steering Committee recommends to National Science Foundation that Ross L. Finney become Project Director.

— National Science Foundation accepts recommendation of Steering Committee.

— Tamarin resigns as Chair of Biology Panel. Panel re-forms as Life Sciences Panel, under guidance of Donald A. Larson (SUNY, Buffalo) who becomes member of National Steering Committee.

22-23 Site visit to Project: Executive Committee of Steering Committee (Chair: W.T. Martin)

30 Meeting: Indiana Regional Mathematics Consortium, Indiana State University, Terre Haute. --Ross L. Finney represents UMAP.

JULY - DECEMBER 1977

OCTOBER

— Issue #3 of UMAP newsletter mailed (2,500 people)
  --Nominations for Consortium Council solicited
  --Announcement of at-cost distribution ($.25/unit) of Stage IV instructional modules
  --UMAP Unit Sampler, Vol. I, announced

— Project hires two part-time editorial consultants: John Alexander (Boston University) and Edwina Michener (Massachusetts Institute of Technology)

— José Alonzo (University of Houston) prepares report on selecting and sequencing of modules

— Signell resigns as Chair of Physics Panel and as member of Steering Committee. Physics Panel re-forming, under guidance of Arnold Strassenburg (SUNY, Stony Brook) who becomes member of Steering Committee.

13-14 Site visit to Project: Executive Committee of Steering Committee (Chair: W.T. Martin)

28-29 Meeting: Illinois Council of Teachers of Mathematics, Northern Illinois University, DeKalb
  --Ross L. Finney represents UMAP

31 UMAP presentation by Ross L. Finney to faculty of Blackburn College, Carlinville, Illinois

31 Meeting: SIAM, Albuquerque, New Mexico
  --Carroll O. Wilde represents UMAP

NOVEMBER

3 Site visit to Project: Executive Committee of Steering Committee (Chair: W.T. Martin)

4-5 Meeting: UMAP Steering Committee (Chair: W.T. Martin)
  --Walter Sears, University of Michigan Press, assumes Chairmanship of Task Force on publication/distribution.

14 Proposal for publication plan submitted to National Science Foundation.

DECEMBER

— Slate of candidates for Consortium Council mailed (2,500 people)

— Statistics Panel established (Chair: Douglas A. Zahn, Florida State University). Frederick Mosteller, Harvard University, joins National Steering Committee.

1-3 Shambaugh Writing Conference, University of Iowa, for political science authors, supported by Shambaugh funds, and hosted by G. Robert Boynton.

JULY - DECEMBER 1977

DECEMBER

— Article on UMAP appears in Newsletter of Northern California and Nevada Section of MAA

— Status of materials production:
Modules--19 printed, 37 under development
Monographs--0 printed, 6 under development

JANUARY - JUNE 1978

JANUARY

4-8 AMS/MAA Joint Mathematics Meetings, Atlanta, Georgia
--First Consortium Council meeting (Chair: Solomon Garfunkel)

5 Meeting: Finite Mathematics Panel (Chair: Kenneth R. Rebman)

FEBRUARY

— Meeting: Northern California Section of MAA
--Carroll O. Wilde and Craig Comstock (Naval Postgraduate School) represent UMAP.

MARCH

— Issue #4 of UMAP newsletter mailed (3,000 people)

22-24 Meeting: Eastern Regional Section of America Statistical Association (ASA)
--Douglas A. Zahn represents UMAP

31 Meeting: UMAP Steering Committee (Chair: George Springer, Indiana University. W.T. Martin out of the country.)

APRIL

— UMAP Catalog, Vol. I produced

1 Site visit to Project: Alexander Barton and James Mulder (National Science Foundation)

6-8 Meeting: Illinois Mathematics Association of Two-Year Colleges, Monticello, Illinois
--Ross L. Finney represents UMAP

14-15 Meeting: Allegheny Mountain Section of MAA, Pittsburgh, Pennsylvania
--James Maynard (Pennsylvania State University) represents UMAP

JANUARY - JUNE 1978

APRIL

20-22 Meeting: Midwest Political Science Association, Chicago, Illinois
--G. Robert Boynton represents UMAP

— Meeting: PRIME 80, Washington, D.C.
--Carroll O. Wilde represents UMAP

MAY

— National Science Foundation approves UMAP publication plan.

— Chairs of UMAP Subject Matter Panels become ex-officio members of Monograph Editorial Board

3 Site visit to Project: Executive Committee of Steering Committee (Chair: W.T. Martin)

5-6 Meeting: Illinois Section of MAA, Macomb, Illinois
--Ross L. Finney represents UMAP

24-26 Meeting: SIAM, Madison, Wisconsin
--Carroll O. Wilde represents UMAP

JUNE

— Issue #5 of UMAP newsletter mailed (3,000 people)
--Nominations for Consortium Council solicited.

— Biomedical Sciences Panel established (Chair: Michael Anbar, SUNY, Buffalo)

— Publication plan: Letters of invitation sent to commercial publishers, university presses, and professional societies.

17-18 Meeting: Pacific Northwest Section of AMS/MAA and SIAM, Eugene, Oregon
--Richard G. Montgomery, Southern Oregon State College, represents UMAP

9 Conference on text-editing standards, hosted by Peter Signell, Washington, D.C.
--Ross L. Finney and Barbara Kelczewski represent UMAP

JULY - DECEMBER 1978

JULY

— Revision of UMAP brochure produced

JULY - DECEMBER 1978

JULY

12-14 Solomon Garfunkel (Consortium Director) and Felicia DeMay (Associate Director) visit Social Science Education Consortium, Boulder, Colorado

AUGUST

— Index and Descriptions of Available Mathematics Modules, Vol. II, produced

7-10 AMS/MAA Joint Mathematics Meetings, Providence, Rhode Island
  --Executive Committee of Steering Committee (Chair: W.T. Martin) meets in conjunction with
  --Consortium Council (Chair: Solomon Garfunkel)
  --Walter Sears and Lynn Steen (St. Olaf College) collaborate on developing criteria for selection of publisher.

14-17 Joint Statistics Meeting, San Diego, California
  --Statistics Panel meeting (Chair: Douglas A. Zahn)
  --Barbara Kelczewski represents UMAP

SEPTEMBER

— Issue #6 of UMAP newsletter mailed (3,000 people)
  --UMAP Unit Sampler, Vol. II, announced

— Project purchases word-processor equipment from Algorithmics.

28 Project staff meets with personnel from MIT Press regarding UMAP publication plan

29-30 Meeting: Miami University Conference on Applications of Statistics and Mathematics, Oxford, Ohio
  --Ross L. Finney and Douglas A. Zahn represent UMAP

OCTOBER

— Marcus Lieberman and Edward De Vos (Harvard University) begin as evaluation team for UMAP

— UMAP materials incorporated in Chautauqua courses conducted by John C. Howe, University of Vermont, Burlington

21 Meeting: National Council of Teachers of Mathematics (NCTM), Louisville, Kentucky
  --Ross L. Finney represents UMAP

29 Meeting: SIAM, Knoxville, Tennessee
  -- Carroll O. Wilde represents UMAP

JULY - DECEMBER 1978

OCTOBER

31 Meeting: Biomedical Sciences Panel (Chair: Michael Anbar)
--Ross L. Finney represents UMAP

NOVEMBER

11 Meeting: Content Development and Coordination Committee (Chair: William F. Lucas)

18-19 Meeting: UMAP Steering Committee (Chair: W.T. Martin)
--R. Duncan Luce (Harvard University) and George Miller (Nassau Community College) join Steering Committee

DECEMBER

— Issue #7 of UMAP newsletter mailed (3,500 people)

5 Project staff meet with personnel from W.H. Freeman and Company regarding UMAP publication plan

7-8 Meeting: Political Science Panel (Chair: G. Robert Boynton)

— Status of materials production:
Modules--102 printed, 77 under development
Monographs--3 printed, 6 under development

JANUARY - JUNE 1979

JANUARY

— Questionnaire, designed by Lieberman and De Vos, mailed to people involved with UMAP

4-5 Meeting: American Association for the Advancement of Science (AAAS), Houston, Texas
--Ross L. Finney and Solomon Garfunkel represent UMAP

24-27 AMS/MAA Joint Mathematics Meetings, Biloxi, Mississippi
--Consortium Council meeting (Chair: Solomon Garfunkel)
--Ross L. Finney, Solomon Garfunkel, and Felicia DeMay represent UMAP

FEBRUARY

— UMAP Catalog, Vol. II, produced

— Meeting: Analysis and Computation Panel (Chair: Carroll O. Wilde)

JANUARY - JUNE 1979

FEBRUARY

7-9	Meeting: NSF Project Directors, Washington, D.C. --Ross L. Finney and Solomon Garfunkel represent UMAP
15	Meeting of UMAP staff and personnel from MAA to discuss cooperation in publication of UMAP Journal.
22-24	Meeting: Second Annual Workshop of Linkage Between Applied Mathematics and Industry, Naval Postgraduate School, Monterey, California --Carroll O. Wilde represents UMAP

MARCH

—	Issue #8 of UMAP newsletter mailed (4,000 people)
—	Outreach mailing to Chairs of Mathematics Department (2,105) informing them of UMAP and inviting department representation
5-9	Colloquium and Pi Mu Epsilon Lecture by Ross L. Finney to Mathematics Department of University of Illinois, Urbana
6-7	Meeting: Second International Survey of Mathematics Achievement, University of Illinois, Urbana --Ross L. Finney represents UMAP
14	Word-processor delivered to UMAP
17-19	Public Choice Meeting, Charleston, South Carolina --G. Robert Boynton, Steven Brams (New York University), Ross L. Finney represent UMAP
30-31	Meeting: Statistics Panel (Chair: Douglas A. Zahn)

APRIL

—	UMAP materials incorporated in Chautauqua courses conducted by Edward Bender, University of California-San Diego
—	Outreach mailing to 350 political scientists suggested by Steven Brams and G. Robert Boynton
—	Outreach mailing to members of National Association of Mathematics from Llayron Clarkson (Texas Southern University)
--	Outreach mailing to Committee on Minorities in Statistics from Douglas A. Zahn
18-20	Meeting: National Council of Teachers of Mathematics (NTCM), Boston --Ross L. Finney, Felicia DeMay, Barbara Kelczewski represent UMAP

JANUARY - JUNE 1979

APRIL

20	Project staff meet with personnel of Pergamon Press to discuss UMAP publication plan
20-21	Meeting: Midwest Section of American Political Scientists Association, Chicago, Illinois --G. Robert Boynton represents UMAP
21	Meeting: Conference Board of Mathematical Sciences, Boston --Ross L. Finney represents UMAP
21-22	Meeting: UMAP Steering Committee (Chair: W.T. Martin) --Committee on publisher selection established --Lynn Steen nominated as Chair of Consortium Council

MAY

—	Charles Frahm (Illinois State University) appointed as Chair of Physics Panel.
4-5	Meeting: Tennessee Mathematics Teachers Association, Chattanooga --Henry Frandsen (University of Tennessee, Knoxville) represents UMAP
5	Meeting: MAA Section Meeting, Adelphi University, Garden City, New York --Joseph Malkevitch (York College, CUNY) represents UMAP
11-12	Meeting: Seaway Section of MAA, Oneonta, New York --Christopher Nevison (Hamilton College) represents UMAP
30	Ross L. Finney gives UMAP presentation to faculty at Naval Postgraduate School, Monterey, California
31	Ross L. Finney gives UMAP presentation to faculty at California Polytechnic State University, San Luis Obispo

JUNE

—	Issue #9 of UMAP newsletter mailed (4,000 people)
1-2	Conference on Experiential and Applied Mathematics Education, sponsored by Mathematics Clinic at Claremont College, Claremont, California --Ross L. Finney represents UMAP
4-6	Ross L. Finney gives UMAP presentation to faculty of Center for Quantitative Sciences at University of Washington, Seattle
11-13	Meeting: SIAM, Toronto, Canada --Carroll O. Wilde and Barbara Kelczewski represent UMAP

JANUARY - JUNE 1979

JUNE

28 Project staff meet with personnel from MIT Press to discuss UMAP publication plan

— Outreach mailing from Statistics Panel to potential reviewers (70).

JULY - DECEMBER 1979

JULY

— UMAP Catalog, Vol. III, produced

— Rebman resigns as Chair of Finite Mathematics Panel, and remains as member of Panel.
Walter Meyer (Adelphi University) assumes Chairmanship of Finite Mathematics Panel.

18 Meeting between UMAP and MAA Executive Committee, Washington, D.C.
--Ross L. Finney and Solomon Garfunkel represent UMAP

19 Ross L. Finney and Solomon Garfunkel meet with Dorothy Deringer, Program Manager,
National Science Foundation

AUGUST

13-16 Meeting: American Statistical Association, Washington D.C.
--Statistics Panel meeting (Chair: Douglas A. Zahn)

21-24 AMS/MAA Joint Mathematics Meetings, Duluth, Minnesota
--Consortium Council meeting (Chair: Lynn A. Steen)
--MAA Board of Governors votes to cooperate with UMAP in publication of The UMAP Journal.

31 Meeting: American Political Science Association, Washington, D.C.
--G. Robert Boynton and Steven Brams represent UMAP

SEPTEMBER

— Issue #10 of UMAP newsletter mailed (6,000 people)
--Nominations for Consortium Council solicited

— UMAP incorporated in proposal to NSF from Kansas State University, Manhattan (George Strecker)
on "Mathematical Modeling for Agricultural Economics."

— UMAP materials incorporated in Chautauqua courses conducted by Robert A. Rosenbaum, Wesleyan
University, Middletown, Connecticut

JULY - DECEMBER 1979

SEPTEMBER

14 Benchmark mailing to contending commercial publishers: Birkhauser Boston, Inc., MIT Press, Pergamon Press, Springer-Verlag.

29-30 Joint Meeting: Content Development and Coordination Committee (Chair: William F. Lucas) and the UMAP Journal Editorial Board (Editor: Ross L. Finney)

— Thrall resigns as Chair of Monograph Editorial Board, and remains as member of Board. Clayton Aucoin (Clemson University) assumes Chairmanship of Monograph Editorial Board

OCTOBER

— Article on UMAP appears in AmStat News (statistics)

— Economics Panel established (Chair: Gerald Egerer, Sonoma State University, Rohnert Park, California)

— Psychology Panel established (Chair: Ewart Thomas, Stanford University)

9 Ross L. Finney presents UMAP to faculty of Nassau Community College

16-20 Meeting: American Mathematics Association of Two-Year Colleges (AMATYC), San Diego, California
--Richard G. Montgomery represents UMAP

26 Meeting of Publication Committee to consider responses from commercial publishers to benchmark mailing

27-28 Meeting: UMAP Steering Committee (Chair: W.T. Martin)
--Report from Publication Committee and recommendation of Birkhauser Boston, Inc. as publisher of UMAP materials
--Report from evaluators of UMAP on analysis of returns on Consortium questionnaire

30 Documentation of UMAP publication design sent to Grants and Contracts Office of National Science Foundation

NOVEMBER

— Precalculus Mathematics Panel established (Chair: Peter Lindstrom, Genesee Community College)

— Publication contract negotiations between Education Development Center, Inc. (EDC) and Birkhauser Boston, Inc.

— Article on UMAP appears in AAPT Announcer (physics)

JULY - DECEMBER 1979

NOVEMBER

1 Meeting: Potomac Regional Mathematics Conference, Montgomery College, Rockville, Maryland
--Ross L. Finney represents UMAP

2-3 Meeting: Association of Teachers of Mathematics in New England, Springfield, Massachusetts
--UMAP materials displayed

15-17 Meeting: National Council of Teachers of Mathematics (NCTM), Nashville, Tennessee
--Ross L. Finney represents UMAP

19 Board of Governors of SIAM vote to cooperate with UMAP in publication of The UMAP Journal.

19 Ross L. Finney gives UMAP presentation to faculty at Northeastern University, Boston, Massachusetts

DECEMBER

— Issue #11 of UMAP newsletter mailed (6,000 people)
--incorporates ballot for election of Consortium Council members

— UMAP evaluators develop survey sent to department representatives to UMAP (1,047)

— Outreach mailing from Finite Mathematics Panel to prospective authors (40).

— Meeting: New York State Two-Year Colleges, Suffolk County Community College. Rochelle Meyer represents UMAP.

3 Publisher contract between Birkhauser Boston, Inc. and EDC, Inc. submitted to National Science Foundation

— Status of materials production:
Modules--142 in print, 120 under development
Monograph--5 printed, 19 under development

JANUARY - JUNE 1980

JANUARY

— Publications contract approved by National Science Foundation.

3-7 AMS/MAA Joint Mathematics Meeting, San Antonio, Texas
--Consortium Council meeting (Chair: Lynn A. Steen)
--Joint Meetings of Content Development and Coordination Committee (Chair: William F. Lucas) and the UMAP Journal Editorial Board (Editor: Ross L. Finney)
--Finite Mathematics Panel meeting (Chair: Walter Meyer)
--Precalculus Mathematics Panel meeting (Chair: Peter Lindstrom)

JANUARY - JUNE 1980

JANUARY

21-24 Joint Meetings of American Physics Society and American Association of Physics Teachers, Chicago, Illinois
--Charles Frahm represents UMAP

FEBRUARY

2 Meeting: Michigan Council of Teachers of Mathematics, Ann Arbor
--Ross L. Finney represents UMAP

MARCH

— Issue #12 of UMAP newsletter mailed (10,000 people)

— UMAP Catalog, Vol. IV, produced

— The UMAP Journal, Vol. I, Number 1, produced

— Precalculus Mathematics Panel questionnaire to UMAP representatives and others involved with UMAP from two-year colleges (app. 350)

— UMAP incorporated in proposal to NSF from SUNY, Stony Brook (Edward Beltrami and James Frauenthal) on "Implementing Undergraduate Modules in Applied Mathematics."

7-8 Meeting: Florida Section of MAA, Jacksonville
--UMAP materials displayed

27-29 Meeting: National Council of Teachers of Mathematics, Peoria, Illinois
--Ross L. Finney represents UMAP

28-29 Meeting: Wisconsin Section of MAA, Madison
--Philip Straffin, University of Wisconsin, represents UMAP

14-16 Meeting: Public Choice Society, San Francisco, California
--G. Robert Boynton represents UMAP

APRIL

— Frahm resigns as Chair of Physics Panel. Robert M. Young, Illinois State University, assumes Chairmanship of Physics Panel

— Zahn resigns as Chair of Statistics Panel

— Article on UMAP appears in News for Teachers of Political Science

JANUARY - JUNE 1980

APRIL

11-12	Meeting: Kansas Section of MAA, Manhattan --S. Thomas Parker and Willard Parker (Kansas State University) represent UMAP
12	Meeting: Maryland-D.C.-Virginia Section of MAA, Richmond, Virginia --Leon Sagan (Anne Arundel Community College) represents UMAP
16-19	Meeting: National Council of Teachers of Mathematics, Seattle, Washington --Peter Lindstrom, Richard Montgomery, and Roland Lamberson (Humboldt State University) represent UMAP and conduct Precalculus Mathematics Panel meeting --Ronald Steffani (Southern Oregon State College) incorporates UMAP in his presentation, "Teaching Mathematics Through Applications."
17-19	Meeting: Klingenstein Fellows at Teachers College, Columbia University --Nancy Rosenberg (Riverdale Country School, Bronx) represents UMAP
25-26	Meeting: Allegheny Mountain Section of MAA, Buckhannon, West Virginia --Michael Mays (West Virginia University) represents UMAP
25-26	Meeting: Missouri Section of MAA, Fulton, Missouri --John Kubicek (Southwest Missouri State University) represents UMAP
26	Meeting: Executive Committee of UMAP Steering Committee (Chair: W.T. Martin)
25-27	Meeting: New York State Mathematics Association for Two-Year Colleges, Freehold, New York --Peter Lindstrom and Warren Page (New York City Community College) represent UMAP

MAY

19-27	Ross L. Finney gives UMAP presentations at: San Francisco State University, Chabot College, Laney College, College of Notre Dame, San Jose State University, Stanford University, and Sonoma State University
23-24	Meeting: Psychology Panel (Chair: Ewart Thomas)

JUNE

—	Issue #13 of UMAP newsletter mailed (10,000 people)
—	Thomas Knapp (University of Rochester) assumes Chairmanship of Statistics Panel
10	Meeting: Executive Committee of UMAP Steering Committee (Chair: W.T. Martin)

JANUARY - JUNE 1980

JUNE

21 Meeting: Northeastern Section of MAA, Williamstown, Massachusetts
--Ross L. Finney, Sinan Koont (University of Massachusetts, Amherst), and Laurie Snell (Dartmouth College) represent UMAP

25 Summer Teachers Institute, University of Lowell, Lowell, Massachusetts
--Ross L. Finney represents UMAP

26 Meeting: National Advisory Committee of EMMSE Project, Amherst, Massachusetts
--Ross L. Finney represents UMAP

JULY - DECEMBER 1980

JULY

17 Meeting: Solomon Garfunkel and Joseph Malkevitch with personnel from Queens High School in New York City to discuss future development of mathematics applications materials for use by high school students. (Support for Garfunkel from EDC proposal development funds.)

AUGUST

— Meeting: American Statistical Association, Houston, Texas
--Statistics Panel meets (Chair: Thomas Knapp)

10-14 Meeting: 4th International Congress of Mathematical Education, Berkeley, California
--Ross L. Finney, Solomon Garfunkel, and Joan Hundhausen (Colorado School of Mines) represent UMAP

18-22 AMS/MAA Joint Mathematics Meetings, Ann Arbor, Michigan
--Consortium Council meeting (Chair: Lynn A. Steen)
--Ross L. Finney and Solomon Garfunkel represent UMAP

SEPTEMBER

— Issue #14 of UMAP newsletter mailed (10,000 people)

— UMAP materials incorporated in Chautauqua courses conducted by Robert A. Rosenbaum, Wesleyan University, Middletown, Connecticut

4 Solomon Garfunkel presents UMAP at Murray Bergtraum High School, New York
(Support for Garfunkel from EDC proposal development funds.)

JULY - DECEMBER 1980

SEPTEMBER

26-27 Ross L. Finney presents UMAP at Eighth Annual Mathematics and Statistics Conference, Miami University of Ohio, Oxford

OCTOBER

— Michael Anbar resigns as Chair of Biomedical Sciences Panel, and remains as member. Vincent Galluci (University of Washington, Seattle) assumes Chairmanship of Biomedical Sciences Panel.

2 UMAP staff meets with evaluators (Lieberman and De Vos) to discuss design of questionnaire to be sent to people involved with UMAP.

11-13 Meeting: American Mathematical Association of Two-Year Colleges, Arlington, Virginia
--Peter Lindstrom represents UMAP

15 Solomon Garfunkel gives model modules writing session at Queens' Math Competency Workshop, Queens' High School, New York, New York. (Support for Garfunkel from EDC proposal development funds.)

24-25 Meeting: Transition Committee (W.T. Martin, George Springer, Lynn A. Steen, Joseph Malkevitch, Ross L. Finney, Solomon Garfunkel, Felicia DeMay) to discuss transition from UMAP Project to Consortium for Mathematics and its Applications (COMAP), Inc.

25-26 Meeting: UMAP National Steering Committee (Chair: W.T. Martin)

NOVEMBER

6-8 Meeting: SIAM, Houston, Texas
--Carroll O. Wilde represents UMAP

20-22 Meeting: National Council of Teachers of Mathematics (NCTM), Arlington, Virginia
--Bernice Kastner (Montgomery College, Takoma Park) represents UMAP

DECEMBER

5 Meeting: California Mathematics Council for Community Colleges, Monterey, California
--Carroll O. Wilde represents UMAP

— Consortium Directory, 1981, produced

— Termination of UMAP Grant # SED 76-19615 A02

— Submission of final technical report to National Science Foundation

JULY - DECEMBER 1980

DECEMBER

— Status of materials production:
  Modules--206 printed, 141 under development
  Monographs--5 printed, 31 under development

ADDENDUM B

Sample Letters to Materials Developers

Response to inquiry for general information

Dear _____:

Thank you for your expression of interest in Project UMAP. Enclosed with this letter are:

- a Project brochure;
- UMAP Projections, the Project newsletter; and,
- the UMAP Catalog.

Again, thank you for your interest. Please let us know if we can send anything further.

Sincerely,

Paula M. Santillo
Assistant to the Directors

Enclosures

Invitation to author of article to prepare a module for UMAP

Dear _____:

I have just finished reading your interesting article, "_____" in the _____. The material seems ideally suited as the basis for a UMAP module. As you may know the UMAP Project (Undergraduate Mathematics Applications Project) is funded by a grant from the National Science Foundation to Education Development Center, Inc.

The goal of UMAP is to develop, through a community of users and developers, a system of instructional modules in undergraduate mathematics and its applications which may be used to supplement existing courses and from which complete courses may eventually be built.

All UMAP modules are peer and student reviewed as well as field-tested. For your information I am enclosing:

- a UMAP brochure;
- the latest issue of our Newsletter;
- a UMAP Catalog;
- a UMAP Author's Manual; and,
- the latest issue of the UMAP Sampler.

We would be very interested in receiving a module based upon your article. We are always interested in innovative applications which can be introduced into the undergraduate curriculum. If you have any questions about UMAP, please feel free to call. I look forward to hearing from you and hope you will become a UMAP contributor.

Sincerely yours,

Ross L. Finney
Project Director

RLF/pms
Enclosures

Acknowledgement of receipt of reviewer background information form

Dear _____:

Thank you very much for returning the background information form for peer reviewers. As appropriate manuscripts arrive in our office, we will forward them for your review.

We highly appreciate your interest and involvement with UMAP. Please let us know if we can send anything further.

Sincerely,

Paula M. Santillo
Assistant to the Directors

Letter to reviewer to accompany manuscript

Dear _____:

We recently received the enclosed manuscript by _____ entitled, "_____," for possible inclusion in the UMAP inventory of modules. We would appreciate your reactions, and are forwarding a copy to you for review, along with the review forms and record of contributed time sheet.

Please let us know if you are unable to conduct the review within a month's time. If you have specific concerns or questions regarding the manuscript, please feel free to call us.

We very much appreciate your continued involvement with UMAP, and look forward to hearing from you.

Sincerely,

Felicia M. DeMay
Associate Director

FMD/pms
Enclosures

Acknowledgement of receipt of review

Dear _____:

Thank you very much for your thorough review of the module by _____ entitled, "_____." When the module is revised and printed, we will send a copy for your records.

We highly appreciate your continued interest and involvement with UMAP.

Sincerely,

Paula M. Santillo
Assistant to the Directors

Reminder letter to reviewer

Dear _____:

We are interested in preparing _____ manuscript, "_____," for field-testing purposes for this coming year; that is, if the network of reviewers finds the manuscript acceptable. We are wondering if you have had an opportunity to examine the manuscript which we sent in _____.

If you are unable to conduct a review of the manuscript, would you please let us know. Thank you for your consideration of this.

We look forward to hearing from you.

Sincerely,

Felicia M. DeMay
Associate Director

FMD/pms

Letter to author rejecting manuscript on basis of review

Dear _____:

I would like to thank you for the submission of your manuscript, "_____," for consideration by UMAP. On the basis of the reviews we have received, the UMAP editorial staff has recommended against its inclusion in the UMAP library.

We sincerely appreciate the time and care you have taken in the preparation of this work. Should you have additional materials which you feel are appropriate for inclusion in UMAP, we hope you will forward this to us.

Sincerely,

Solomon A. Garfunkel
Consortium Director

pms

Letter to author to accompany reviews of manuscript

Dear _____:

Enclosed are copies of reviews and annotated pages of your manuscript, "_____." We would like you to consider these reactions in preparing a revision of your manuscript. Sol Garfunkel, Associate Director, has studied the manuscript and reviews. Should you wish to discuss ideas for revision with him, please feel free to call him collect (617-969-7100, Ext. 282) on any Thursday. (Sol teaches at the University of Connecticut and is in this office on Thursdays this semester.)

When we receive your revision, the material will be typed in format in preparation for field-testing. We highly appreciate your continued interest and involvement.

Let us know if we can be of any assistance.

Sincerely,

Felicia M. DeMay
Associate Director

FMD/pms
Enclosures

Acknowledgement of receipt of revised manuscript

Dear _____:

Thank you for your revision of "_____." One of the editors is looking at the revised manuscript and will contact you if there are any problems. Otherwise, it will be put into production. You will receive a final typed copy for you to proof-read before it goes to print.

We appreciate your continued involvement with UMAP.

Sincerely,

Paula M. Santillo
Assistant to the Directors

Letter to author to accompany copy of printed module

Dear _____:

Enclosed is a copy of your unit, "_____," which recently came off the press. We want to take this opportunity to express our thanks for the fine work you are doing on behalf of Project UMAP.

The Project would be more than happy to write a letter on your behalf (with reference to the fine quality of your contributions) to your dean or department chairman with a copy of this unit enclosed. Let us know to whom the letter should be addressed if you wish us to do so.

We appreciate your involvement very much.

Sincerely,

Ross L. Finney
Project Director

RLF/pms
Enclosure

Letter to field-tester to accompany classroom copies of module

Dear _____:

Enclosed for field-testing purposes are _____ copies of _____ "_____," along with instructor field-test forms.

We highly appreciate your involvement, and look forward to receiving your data.

Sincerely,

Paula M. Santillo
Assistant to the Directors

Enclosures

Letter to author to accompany final copy of Stage IV revision

Dear _____:

Enclosed is a copy of the stage IV revision of your module, "_____," that will be sent to Birkhauser Boston, Inc. for publication. Please read the unit carefully and contact me with any changes or corrections that need to be made. You may call me collect at Extension 283.

The unit is scheduled to be sent to Birkhauser on _____. To allow time for corrections to be made, I would appreciate hearing from you by _____.

Thank you for the time and effort you have contributed to UMAP. We look forward to having your unit available for distribution.

Sincerely,

Barbara A. Kelczewski
Coordinator for
Materials Production

pms
Enclosure

B14

Letter to dean or department chair acknowledging work of author, reviewer, or field-tester

Dear _____:

_____ of your faculty has recently _____ the enclosed module entitled, "_____" for Project UMAP, and I am writing to express the appreciation of my colleagues and myself for _____ work.

The goal of UMAP is to develop, through a community of users and developers, a system of instructional modules in undergraduate mathematics and its applications which may be used to supplement existing courses and from which complete courses may eventually be built. The Project is funded by a grant from the National Science Foundation to Education Development Center, Inc., and is guided by a National Steering Committee of mathematicians, scientists and educators.

Your _____ contribution to this endeavor by encouraging and recognizing professional contributions to curriculum development is greatly appreciated.

Sincerely yours,

Ross L. Finney
Project Director

RLF/pms
Enclosure

ADDENDUM C

THE UMAP JOURNAL EDITORIAL BOARD

	Area
Ross L. Finney Director, Project UMAP	Editor
Richard J. Allen St. Olaf College	Non-numerical computing applications
Michael Anbar SUNY, Stony Brook	Biomedical sciences
Clayton Aucoin Clemson University	Industrial applications; education
Robert G. Bartle University of Illinois, Urbana	Reviews editor (appointed by MAA)
G. Robert Boynton University of Iowa	Political science
Geraldine A. Coon Goucher College	Electrical engineering (appointed by MAA)
Gerald Egerer Sonoma State University	Economics
Solomon A. Garfunkel University of Connecticut	History
Thomas R. Knapp University of Rochester	Statistics
Richard Haberman Southern Methodist University	Hydrodynamics; perturbation methods (appointed by SIAM)
Peter Lindstrom Genesee Community College	Education (appointed by MAA)
William F. Lucas Cornell University	Operations research
Walter Meyer Adelphi University	Discrete mathematics; history
Melvin R. Scott Sandia Laboratories	Industrial applications (appointed by SIAM)
Ewart Thomas Stanford University	Psychology; statistics
Maynard Thompson University of Indiana	Biomedical and social sciences (appointed by SIAM)
Carroll O. Wilde Naval Postgraduate School	Numerical analysis
Robert Young Illinois State University	Physics
Douglas A. Zahn Florida State University	Statistics

ADDENDUM D

PUBLISHED AND DISTRIBUTED BY BIRKHAUSER BOSTON, INC.

Bedian, V.: Evaluation of Diagnostic Tests and Decision Analysis (U377)

Brams, S., M. Davis and P. Straffin: The Geometry of the Arms Race (U311)

Calter, P.: Graphical and Numerical Solution of Differential Equations (U81-83)

Cannon, R.: Recognition of Problems Solved by Exponential Functions (U84)

Cannon, R.: Exponential Growth and Decay (U85)

Cannon, R.: Development of the Function $Y=e^{cx}$ (U86)

Cannon, R.: Numerical Approximations to $y=e^{x}$ (U87)

Cannon, R.: How to Solve Problems Involving Exponential Functions (U88)

Cohen, S.: Ascent-Descent (U331)

Finney, R.: Determining Constants of Integration (U162)

Gillespie, J., D. Zinnes and G. S. Tahim: The Richardson Arms Race Model (U308)

Hoffman, D.: Monte Carlo: The Use of Random Digits to Simulate Experiments (U269)

Horelick, B. and S. Koont: The Digestive Process of Sheep (U69)

Horelick, B. and S. Koont: Selection in Genetics (U70)

Horelick, B. and S. Koont: Measuring Cardiac Output (U71)

Horelick, B. and S. Koont: Prescribing Safe and Effective Dosage (U72)

Horelick, B. and S. Koont: Epidemics (U73)

Horelick, B. and S. Koont: Tracer Methods in Permeability (U74)

Horelick, B. and S. Koont: Feldman's Model (U75)

Horelick, B. and S. Koont: Kinetics of Single Reactant Reactions (U232)

Horelick, B. and S. Koont: π is Irrational (U240)

Horelick, B. and S. Koont: The Wallis Approximation of π (U241)

Horelick, B. and S. Koont: Buffon's Needle Experiment (U242)

Horelick, B. and S. Koont: A Strange Result in Visual Perception (U251)

Horelick, B., S. Koont and S. F. Gottlieb: Modeling the Nervous System: Reaction Time and the Central Nervous System (U67)

Horelick, B., S. Koont and S. F. Gottlieb: Population Growth and the Logistic Curve (U68)

Huckfeldt, R.: The Dynamics of Political Mobilization I: A Model of the Mobilization Process (U297)

Huckfeldt, R.: The Dynamics of Political Mobilization II: Deductive Consequences and Empirical Application of the Model (U298)

Kasting, M.: Interior Design: Preparing an Estimate (U375)

Kayne, H.: Testing a Hypothesis: t-Test for Independent Samples (U268)

Keller, E.L.: Population Projection (U345)

Keller, Sr. M.: Food Service Management (U105) and Applications of Matrix Methods: Food Service and Dietary Requirements (U109)

Keller, Sr. M.: Computer Graphics (U106) and Applications of Matrix Methods: Three Dimensional Computer Graphics and Projections (U110)

Keller, Sr. M.: Applications of Matrix Methods to Markov Chains (U107 and Fixed Point and Absorbing Markov Chains (U111)

Keller, Sr. M.: Applications of Matrix Methods to Electrical Circuits (U108) and Analysis of Linear Circuits (U112)

Kleinbaum, D.G. and A. Kleinbaum: Adjusted Rates: The Direct Rate (U330)

Likens, T.: The Budgetary Process: Incrementalism (U332)

Likens, T.: The Budgetary Process: Competition (U333)

Lindstrom, P.: Developing the Fundamental Theorem of Calculus (U323)

Max, N.: Curves and Their Parametrization (U216)

Maynard, J.: A Linear Programming Model for Scheduling Prison Guards (U272)

Meyerson, M.: The Impossibility of Trisecting Angles (U267)

Montgomery, R.G.: Listening to the Earth: Controlled Source Seismology (U292)

Nevison, C.: Lagrange Multipliers: Applications to Economics (U270)

Nevison, C.: Price Discrimination and Consumer Surplus (U294)

Nevison, C.: Differentiation, Curve Sketching, and Cost Functions (U376)

Rheinboldt, W.: Horner's Scheme and Related Algorithms (U263)

Rheinboldt, W.: Algorithms for Finding Zeroes of Functions (U264)

Rice, B. and C. Wilde: Error Correcting Codes I (U346)

Salert, B.: Public Support for Presidents I and II (U299-300)

Schey, H.: The Distribution of Resources (U60-62)

Schoenfeld, A.: Integration: Getting It All Together (U203-205)

Sherbert, D.: Difference Equations with Applications (U322)

Smith, H.: Nuclear Deterrance (U327)

Solomon, F.: Tomography: Three Dimensional Image Reconstruction (U318)

Tuchinsky, P.: Mercator's World Map and the Calculus (U206)

Tuchinsky, P.: Management of a Buffalo Herd (U207)

Tuchinsky, P.: General Equilibrium - A Leontief Economic Model (U209)

Tuchinsky, P.: Viscous Fluid Flow and the Integral Calculus (U210)

Tuchinsky, P.: The Human Cough (U211)

Tuchinsky, P.: Zipf's Law and His Efforts to Use Infinite Series in Linguistics (U215)

Whitley, W. T.: Five Applications of Max-Min Theory from Calculus (U341)

Expository Monographs

Brams, S. J.: Spatial Models of Election Competition

Cline, R.: Elements of the Theory of Generalized Inverses for Matrices

Frauenthal, J.: Introduction to Population Modeling

Pfeiffer, P.: Conditional Independence in Applied Probability

Straffin, P.: Topics in the Theory of Voting

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MODULES AVAILABLE FOR FIELD-TESTING

Alexander, J.: Measures of Association (U321)

Carlson, R.: Conditional Probability and Ambiguous Information (391)

Carlson, R.: An Application of Mathematical Groups to Structures of Human Groups (U476)

Casstevens, T.: Exponential Models of Legislative Turnover (U296)

Cohen, S.: Aspects of Coding (U336)

Dershem, H.: Computer Problem Solving (U477)

Dershem, H.: Iteration and Computer Problem Solving (U478)

Eisen, M.: Graphical Analysis of Some Difference Equations Occurring in Mathematical Biology (U553)

Enelow, J.: An Application of Voting Theory to Congress (U386)

Falbo, C.: Nonzero Sum Games (U495)

Fink, A.M.: Kepler's Laws and the Inverse Square Law (U473)

Fink, A.M.: Sturmian Sequences for Isolating Zeroes of Polynomials (U490)

Gale, D.: The Optimal Assignment Problem (U317)

Gallian, J.: An Application of Dihedral Groups (U460)

Geitz, R.: The Cobb-Douglas Production Function (U509)

Giordano, F. and M. Wells, and C. Wilde: Dimensional Analysis (U526)

Goldston, J. W.: Solving Differential Equations Analytically (U335)

Grimaldi, R.: Balancing Chemical Reactions with Matrix Methods and Computer Assistance (U339)

Grimm, C.A.: A Unified Method for Finding Laplace Transforms, Fourier Transforms, and Fourier Series (U324)

Grimm, C.A.: An Inversion Method for Finding Laplace Transforms, Fourier Transforms, and Fourier Series (U325)

Guthrie, D. and J. Service: Approximations in Probability Calculations (U443)

Harmon, K.: The Diffusion of Innovation in Family Planning (U303)

Horelick, B. and S. Koont: Radioactive Chains: Parents and Daughters (U234)

Hundhausen, J. and R. A. Walsh: The Gradient and Some of Its Applications (U431)

Insel, A.J.: Atmospheric Pressure in Relation to Height and Temperature (U426)

Kasting, M.: Concepts of Mathematics for Business: Background Mathematics (U3670369)

Kasting, M.: Concepts of Mathematics for Business: The Mathematics of Finance (U370-372)

Knapp, T.: Regression Toward the Mean (U406)

Kohfeld, C.: Growth of Partisan Support I: Model and Estimation (U304)

Kohfeld, C.: Growth of Partisan Support II: Model Analytics (U305)

Lamm, T.: Fitting Equations to Data I (U433)

Likens, T.: Discretionary Review by the Supreme Court I: The Model (U306)

Likens, T.: Discretionary Review by the Supreme Court II: Analysis of the Model (U307)

Luttman, F.W.: Selected Applications of Mathematics to Finance and Investment (U381)

Malkevitch, J.: Applications of Vertex Coloring Problems for Graphs (U442)

Max, N.: The Alexander Horned Sphere (U231)

Mays, M.: The Force of Interest (U382)

Merrill, S.: Decision Analysis for Multi-Candidate Voting Systems (U384)

Motter, W.L.: Elementary Techniques of Numerical Integration (U379)

Nevison, C.: Measures of Voting Unity (U271 a,b,c)

Peressini, A.: The Design of Honeycombs (U502)

Peressini, A.: Shape of the Surface of a Rotating Liquid (U507)

Prussing, J.E.: The Relationship Between Directional Heading of an Automobile and Steering Wheel Deflection (U506)

Rosenberg, N.: Linear Programming in Two Dimensions I (U453)

Rosenberg, N.: Linear Programming in Two Dimensions II (U454)

Rosenberg, N.: Genetic Counseling (U456)

Rosenberg, N.: An Introduction to Groups (U461)

Sherbert, D.: The .6 Rule of Industrial Costs (U508)

Sherbert, D.: The Manufacturing Progress Curve (U511)

Sherman, G.: A Double-Error Correcting Code (U377)

Solomon, F.: Using Quaternions to Compose Rotations (U313)

Stegemoller, C.W.: Derivatives of Sines and Cosines (U158-161)

Tuchinsky, P.: General Equilibrium: Simple Linear Models (U208)

Uebelacker, J.: A (Not Really) Complex Method for Finding Solutions to Linear Differential Equations (U497)

Wagon, S.: Evaluating Definite Integrals on a Computer: Theory and Practice (U432)

Walker, R.: Basic Descriptive Statistics (U428)

Wilde, C.O.: The Contraction Mapping Principle (U326)

Wilde, C.O.: The Poisson Random Process (U340)

Wilde, C.O.: Calculus of Variations with Applications in Mechanics (U468)

Yui, C. and C.O. Wilde: The Levi-Civita Tensor and Identities in Vector Analysis (U427)

Accepted on the Basis of Reviews; Being Revised for Field-Testing

Altfeld and deMesquita: National Decisions to Enter Wars (U394)

Berresford: Differential Equations and Root Cellars (U554)

Blanchard, Thron, and Snell: Renewal Theory (U438)

Boldt: Geometrical and Functional Insights Concerning the Consequences of Relativity Theory (U498)

Chase: The Numbers Game--A First Mathematical Modeling Unit (U312)

Cleaves: Problem Packets in Business (U436)

Cleaves: Problem Packets in Construction Technology (U537)

Dancis: Perturbations--The Effects of Measurement Errors (U481)

Dancis: Design Problems (U482)

Dancis: Computerized Tomography (U483)

Fellin: Primitive Shift Registers (U310)

Gotter: Nonparametric Statistics (U408-410)

Gotter: The Nature of Probability (U414-417)

Grofman: Models of Jury Decision Making Process: Impact of Jury Size and Jury Verdict Requirement (U395)

Growney: I Will If You Will (U539)

Gwinn: Introduction to Spacetime (U470-472)

Horelick and Koont: Applications to Economics (U76-78)

Horelick and Koont: Applications to Chemistry (U233-235)

Horelick and Koont: Applications to Psychology (U248-250)

Hundhausen and Walsh: Unconstrained Optimization: Refinement of Local Extrema by Gradient Search Process (U522)

King: The Pace of Life: Introduction to Empirical Model-Fitting (U551)

Knapp: t-Test for Independent Samples (U555)

Lamm: Fitting Equations to Data II (U434)

Lindstrom: Applications of Nominal and Effective Rates of Interest (U474)

Lindstrom: Some Card Tricks Solved by Elementary Algebra (U560)

Lippman: Cumulative Voting by Corporation Shareholders (U320)

LoBello: Applications of Mathematics to Textual Criticism and Linguistics (U334)

Malm: Gauss' Circle Problem and Other Matters (U525)

Marcus-Roberts: Why are Data Normally Distributed? (U556)

Nordstrom: Project Evaluation and Review Techniques (U466)

Pace and Galit: Research Reliability in Experimental Social Science (U559)

Patten: Finding the Shortest Distance from Here to Timbuktu (U562)

Pelikan: Exponential Functions in Biology (U291)

Peressini: The Motion of a Gyroscope (U505)

Peressini: The Design of Weirs (U512)

Peressini: Applications of Calculus to Satellite Motion and Orbital Maneuvers (U515)

Peressini: Applications of LaGrange Multipliers to Design of Multi-Stage Rockets (U517)

Peressini and Zaring: A Mathematical Model of the Aorta (U500)

Prussing: Drag on Objects Moving Thru Fluids (U513)

Rickey: Qualitative Graphic Techniques (U378)

Rockett: Line Reflections in the Cartesian Plane (U479)

Ruckle: Series and Games--From Paradox to Paradox (U396)

Schmalz: Depreciation as Function (U485)

Sherbert: Marginal Analysis of Cost and Profit (U503)

Sherbert: Elasticity of Demand (U504)

Smith, D.: Descriptive Models for Perception of Optical Illusions (U534)

Snell: Branching Processes (U441)

Tuchinsky: Easy D.C. Circuits (U212)

Tuchinsky: International Standard Book Numbers (U213)

Tuchinsky: Least Squares, Fish Ecology and the Chain Rule (U489)

Weichsel: Applications of Logarithms to Sound, Noise, and Acoustical Design (U514)

Whitley: Applications of Exponential and Logarithmic Functions (U444)

Wittman: Theories of Justice--A Mathematical Survey (390)

Modules Under Development

Aldrich, J.: The Presidential Primary Game (Political Science)

Balinski and Young: How Should Congress be Apportioned? (Political Science)

Barnes: Random Walks--An Introduction to Stochastic Processes

Barrett: Zeros of Functions (Analysis and Computation)

Barrett: Interlacing Theorems--Vibrating Systems (Analysis and Computation)

Barrett: Separation Theorems--Sturm-Liouville Problems (Analysis and Computation)

Barrett: a sequence of modules on Green's Functions (Analysis and Computation)

Barrett and Grimm: Linear Ordinary Differential Equations by Vector Methods (Analysis and Computation)

Batchelder: Rating Systems for Human Abilities: The Case of Rating Chess Skills (Psychology)

Beals: module on taxation (Economics)

Beals: module on regression analysis (Economics)

Bender: Traffic Flow--Laplace Transforms

Beres: on discrete dynamical systems

Berresford: Random Walks and Fluctuations

Blakley: Analytic Functions (Analysis and Computation)

Blakley: a module on Cryptology (Analysis and Computation)

Bolger: Measuring Voting Power in a Two-Candidate Presidential Election

Braden: Design of the Ideal Oscillating Sprinkler

Brooks: computer and calculus course modules

Burkhart: Public Key Cryptography

Carnevale: Rational Models in Management and Economics (Precalculus Mathematics)

Casstevens: Birth and Death Processes of Governmental Bureaus in the U.S.

Cooke: Almost-Periodic Functions

Cooke: several units on Computer Simulation

Cornell, et.al.: Statistical Evaluation of Burn Care

Edgington: Randomization Tests (Statistics)

Eisen: Graphical Analysis of Some Difference Equations Occurring in Mathematical Biology (Finite Mathematics)

Falmagne: Some Applications of Functional Equations in Modeling Psychological Phenomena

Feldman: Consumer Price Index

Fellin: Adders and Their Designs

Fiegl: Sample Size Determination

Geitz: Dynamic Growth Models

Goldberg: A Linear Algebraic Method for Balancing Chemical Equations (Finite Mathematics)

Golomb: One-Sided Operators in Rings (Finite Mathematics)

Gordon: The Three-Dimensional Trapezoid Rule

Greeno: Production Systems and Basic Problem Solving

Grimaldi: Combinatorial Mathematics--The Principle of Inclusion and Exclusion

Grossberg: Why Do Cells Compete? Some Examples for Visual Perception (Psychology)

Grossberg: Transmitters, Expectancies, Extinction, and Avoidance (Psychology)

Growney: The Rabbit Under the Bush and Other Path Problems

Growney: Measuring Uncertainty

Growney: Prisoners Dilemma

Growney: Multiperson Prisoner's Dilemma Situations

Growney: Meaningfulness of Measurement

Growney: Parable of the Watchmaker

Growney: How Many License Plates?

Growney: Measuring Certainty--Assigning Probabilities

Growney: Testing A Model

Guay: Maximally Concentrating Collectors for Solar Energy Applications

Harrison and Wilde: Coupled Oscillators (Analysis and Computation)

Hasling and Freeman: A Pocket Solution to Poisson's Equation for Meteorologists and Oceanographers (Analysis and Computation)

Hoffman: Critical Path Method (Precalculus Mathematics)

Horelick and Koont: 4 units in chemistry

Horelick and Koont: 4 units in physics

Hundhausen and Walsh: Directional Derivative, Without Use of Gradient

Iverson: Recall From Memory (Psychology)

Johnson: Bayesian Analysis of an Investment Decision (Economics)

Keating: on applications of circular functions to rotors

Lange: Coding and Number Theory

Ledbetter: matrices and linear algebra with applications in economics (Economics)

Ledbetter: semi-definite integral with applications in demography (Economics)

Ledbetter: word problems (Economics)

Lee: A Computerized Demonstration of the Central Limit Theorem in Statistics (Statistics)

Links: Crime vs. Punishment (Psychology)

Lucier: Armament Procedure as Rational Adaptation (Political Science)

Malkevitch: graph theory module on Shortest Path Problems (Finite Mathematics)

Malkevitch: applications involving Conic Sections (Finite Mathematics)

Marcus-Roberts: Analysis of Alternative Eugenics and Animal Breeding (Finite Mathematics)

Mathews: Bilinear Transformations

Mathews: Conformal Mapping

Mathews: Applications of Harmonic Functions

Mathews: Physical Applications of Harmonic Functions

Mathews: The Schwarz-Christoffel Transformation

Max: Nowhere Differentiable Functions

Max: Peano's Space-Filling Curve

McGivney: Applications of Transcendental Functions (Precalculus Mathematics)

McKnabb: on generalized complex numbers

McKnabb: a field extension of modulo 2

McKnabb: curve fitting

McKnabb: critical path analysis

McKnabb: mass point geometry

McLeod: Continuity and Limits

Meyerson: Surfaces--An Experiment Workbook

Mock: on solar energy

Moe: Why People Join Interest Groups (Political Science)

Niemi: Models of Fair Legislative Districting (Political Science)

Nordstrom: Transportation Problem I and II

Nordstrom: Simplex Method of Linear Programming

Nordstrom: Extensions of Simplex Algorithm

Nordstrom: Postoptimality Analysis

Nordstrom: Inventory Models--Deterministic and Probabilistic

Nordstrom: Lagrangial Multipliers

Nordstrom: Queuing Theory--Single Channel, Several Service Channels, Departures from Earlier Stated Conditions, and Simulation

O'Goody: on divisibility property of integers

O'Neil: A Mathematical Model of a Universal Joint

Patten: Present Value of a Variable Perpetuity

Penna: on conic sections and relationships to orbits of planets (Precalculus)

Penna: on conics and transformations of the plane (Precalculus)

Peressini: Rocket Equations and Rocket Flight Performance

Peressini and Zaring: Some Applications of Algebra and Trigonometry to Space Science

Prussing: Drag on Objects Moving Through Fluids (Physics)

Purdue: Common Models for Uncommon Situations (Statistics)

Rebman: modules on Scheduling Theory (Finite Mathematics)

Rebman: modules on Voting Problems (Finite Mathematics)

Rheinboldt: Floating Point Numbers

Rice and Wilde: Error Correcting Codes II and III (Analysis & Computation)

Robertson: A Brief History of the Foundations of Mathematics

Rosenberg: An Introduction to Symbolic Logic and Boolean Algebra

Rosenthal and Zahn: Power Analysis (Statistics)

Rosenthal and Zahn: Blocking (Statistics)

Rosenthal and Zahn: Contrasts (Statistics)

Rosenthal and Zahn: Interaction Effects (Statistics)

Rosenthal and Zahn: Incomplete Factorial Designs (Statistics)

Rosenthal and Zahn: Combining Results of Independent Studies (Statistics)

Ross, B.: Applications of Expansions in Powers of a Small Parameter

Ross, S.: Mathematical Model for Tooth Replacement (Precalculus Mathematics)

Schochetman: Applications of Exponential and Logarithmic Functions (Precalculus Mathematics)

Shepsle and Weingast: Rational Models of Institutional Structures (Political Science)

Spielman: Exploratory Data Analysis (Precalculus Mathematics)

Starr: application of Bouwer fixed point theorem to the determination of general equilibrium (Economics)

Stauffer: Computer Simulation of Forest Growth (Finite Mathematics)

Strecker, et.al.: Keeping Dimensions Straight

Thayer: Mountain Campus Mathematics I (Precalculus Mathematics)

Thomas: Expectancy and Simple Reaction Time (Psychology)

Tornheim: Determining Age and Size of Hydrocarbon Deposits (Finite Mathematics)

Townsend: Serial Vs. Parallel Processing (Psychology)

Travers and Heeler: Iterative Approach to Linear Regression (Statistics)

Tuchinsky: Is the Circle's Area Really πR^2?

Urquhart: The Anatomy of a Study (Statistics)

Uslaner: Vote Trading in Legislative Bodies

Wagner and Rietmulder: A Cash Flow Model for Magazine Subscriptions (Precalculus Mathematics)

Wandell: on mathematics of color vision (Psychology)

Wang: Simplification of Boolean Valued Data by Minimum Covering

Weir: modules on differential and integral calculus (Analysis and Computation)

Weisberg: Voter Turnout at Elections (Political Science)

Wheeler and Montgomery: Layout Design for Sheet Metal Fabrication (Precalculus Mathematics)

Winkel: Number Theory and Coding Theory (Finite Mathematics)

Yates: Subjective Probability Scoring Rules (Psychology)

Prospective Materials from Potential Authors

Balomenos: remedial math/precalculus/calculus

Banks: Solar Storage Temperature Analysis

Banks: Detection of Chopper Thermal Radiation

Barnier: Keno

Barrowes: The Algebra Game--Statistical Disproof of Astrology

Bartel: an original method of factoring quadratic expressions

Broline: Integration by Partial Fraction: Modified Heavyside Transformations

Broline: Integration by Parts: Tabular Form

Broman: Holditch's Theorem

Brumbaugh: Mathematics Simulation--What is Involved in Apartment Building

Chi: Mathematical Models of Political Process

Chow: Central Limit Theorem

Clarkson: Sketching Graphs from Graphs

Coon: Water Pollution

Cowen: A Mathematical Model of the Pulfricle Phenomenon (physiological psychology)

Dolci: An Application of System Dynamics

Eierman: Applied Heuristic Iterative Methods

Eierman: Applied Constrained Optimization Methods

Eisenman: Differentials Get "Mod" and Integrals Get "Mean"

Eisner: Applications in politics

Flake: Curve Fitting using microcomputer graphics

Flake: Linear programming using the computer

Friel: Constant Rate Harvesting One of Two Competing Species

Gibbons: Selecting and Ordering Populations
Haddock: Structural Identifiability
Hadidi: Probabilistic Arguments in Queueing Models and Their Regulation
Hawley: The U.S. Standard Atmosphere
Heatherly: population dynamics
Heatherly: integral transforms
Heatherly: difference equations
Henney: Complex analysis with a multitude of applications
Hernday: Special products and factoring
Huddleston: Forecasting Local Government Revenue
Johnson: The Washing of Socks
Kleiner: A Weighted Voting Model
Kung: Vector Applications
LaBrocca: Geometric similarity
Lee: Permutations in Practice
Lewis: Trailer Truck Jackknifing
Marrinen: business applications and operations research
Maurer: Combinatorics and Optimization "Matroids and the Greedy Algorithm"
McGrath: Distance of a point from an ellipse
McRae: modeling the possible extinction of grizzlies in Yellowstone
McRay: The Fly Problem--modeling population
McRay: on computational suitability
Metts: Queueing Theory: An Application of Probability
McIntyre: some topics in intuitive geometry
Mugrage: Victors in Elementary Trigonometry
Nitz: Measures of Inequality
Nugent: Decisions on inventory and scrap value
Nugent: Finite fields from elementary number theory
Nugent: An introduction to computers for a mathematics student
Phillips: Sumbolic Logic and Computers
Picker: Inverse Problems in the Physical Science
Pomeranz: Advances in Statistics
Pope: Laplace and Fourier Transforms
Pulfer: Numercial solutions to nonlinear first order differential equations
Rajagopalan: order-of-magnitude analysis of differential equations
Rajagopalan: inspectional analysis

Rajagopalan: similarity and symmetry concepts in the solution of partial differential equations

Reiner: Linear programming with special structuring

Robertson: Foundations unit for the uninformed

Schelin: calculator function approximation (binary coded decimals) (trig addition formulas and the 'cordic' scheme)

Segal: applications of integration to flow velocity and volume

Sengupta: probability methods in stereology

Singer: A Concrete Prelude to Symbolic Logic

Sloyer: Geometric Programming: An Adventure Into the History of Applied Mathematics

Snider: estimating population size

Thompson: educational statistics and/or Earth grading in landscape architecture

White: The Optics of Haze

White: Fingerprinting pollution sources

Wang: An application of orthogonal transformations to an air traffic control radar system

Wattel: application of mathematics to problems of drug metabolism to ecology and to room acoustics

White, J.: 3 modules sequence on DNA structure

Whitman: intuitive equation solving

ADDENDUM E

UMAP NATIONAL STEERING COMMITTEE

*Chair: W. T. Martin, Massachusetts Institute of Technology
(July 1976 - January 1981)

Steven J. Brams, New York University (February 1977 - January 1981)

Llayron Clarkson, Texas Southern University (July 1976 - January 1981)

James D. Forman, Rochester Institute of Technology (July 1976 - June 1978)

*Ernest Henley, University of Houston (July 1976 - January 1981)

William A. Hogan, Harvard University (November 1978 - January 1981)

Nancy Kopell, Northeastern University (February 1977 - October 1977)

Donald A. Larson, State University of New York, Buffalo
(November 1977 - January 1981)

*William F. Lucas, Cornell University (July 1976 - January 1981)

R. Duncan Luce, Harvard University (November 1978 - January 1981)

George M. Miller, Nassau Community College (November 1978 - January 1981)

Frederick Mosteller, Harvard University (March 1978 - July 1980)

Walter E. Sears, University of Michigan Press (February 1977 - January 1981)

**Peter Signell, Michigan State University (July 1976 - October 1977)

*George Springer, Indiana University (July 1976 - January 1981)

Arnold Strassenburg, State University of New York, Stony Brook
(November 1978 - January 1981)

Robert Tamarin, Boston University (February 1977 - September 1977)

Alfred B. Willcox, Mathematical Association of America
(July 1976 - January 1981)

---

*Members of Executive Committee of the Steering Committee

**Professor Signell was a member of the Executive Committee during his term as National Steering Committee member.

ADDENDUM F

CONSORTIUM COUNCIL

Chair: Lynn A. Steen, St. Olaf College (August 1978 - present)

Steven J. Brams, New York University (representative from UMAP Steering Committee) (January 1980 - present)

Joseph Gallian, University of Minnesota, Duluth (January 1980 - present)

*Solomon Garfunkel, University of Connecticut, Storrs (Consortium Director)

*James Glasenapp, Rochester Institute of Technology (January 1977 - January 1978)

Joan Hundhausen, Colorado School of Mines (January 1980 - present)

William F. Lucas, Cornell University (representative from UMAP Steering Committee) (August 1978 - present)

*Joseph Malkevitch, York College (CUNY) (January 1977 - present)

Richard G. Montgomery, Southern Oregon State College (August 1979 - present)

Jacqueline Moss, Paducah Community College (representative from MAA) (January 1980 - present)

Warren Page, New York City Community College (January 1980 - present)

Fred S. Roberts, Cornell University (representative from SIAM) (January 1980 - present)

*Leon Sagan, Anne Arundel Community College (January 1977 - September 1979)

Alan Shuchat, Wellesley College (January 1977 - January 1978)

Roland Smith, Russell Sage College (August 1978 - January 1980)

---

*Members of Consortium Committee, 1977 (pre-Consortium Council)

ADDENDUM G

INFORMATION MATERIALS: SUBJECT MATTER PANELS

BIOMEDICAL SCIENCES PANEL G 1 - G 4

FINITE MATHEMATICS PANEL G 5 - G 6

PHYSICS PANEL G 7 - G 8

PRECALCULUS MATHEMATICS PANEL G 9 - G12

STATISTICS PANEL G13 - G15

MONOGRAPH EDITORIAL BOARD G16 - G17

MODULES ON PHYSICAL PROCESSES IN TERRESTRIAL AND AQUATIC ECOSYSTEMS

Background Mathematics
- Differentiation*
- Integration*
- Dimensional Methods

Thermodynamics in Ecology
- Foundations of Physical Theory: Force and Energy
- Foundations of Physical Theory: The First and Second Laws of Thermodynamics, Entropy and Free Energy
- The First Law of Thermodynamics for Ecosystems
- The Application of the First Law to Ecological Systems
- Thermodynamics of Irreversible Processes
- Application of Irreversible Thermodynamics to Ecosystems

Transport Processes in Ecology
- Turbulence and Fluid Flow
- Pressure and Buoyancy in Aquatic Ecosystems*
- Fluid Dynamics Applied to Streams
- Transpiration and Leaf Temperature*
- Heat Balance of a Sheep in the Sun
- Radiation Incident on an Organism*
- Heat Transfer Processes for the Thermal Energy Balance of Organisms
- The Climate-Space Concept
- Animal Thermoregulation and the Operative Environmental Temperature
- Soil Heat Flow*

Applied Mathematics for Research
- The Finite-Element Method*

Related Ecological Processes
- Photosynthesis*
- Biological Production in Lakes*
- Light and Sound: Evolutionary Aspects

Support Programs and Subroutines

- Design Standards
- User's Guide for PRNT3D
- Programmer's Guide for PRNT3D
- PRNT3D Printer Plot Package**
- User's Guide to FFORM
- Programmer's Guide to FFORM
- FFORM Format Free Input Package**
- User's Guide to PLOT3D
- Programmer's Guide to PLOT3D
- PLOT3D Plotting Package**

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*These modules include computer programs which are available on tape in fully portable ANSI Fortran.

**Programs available on tape in fully portable ANSI Fortran.

PHYSICAL PROCESSES IN TERRESTRIAL AND AQUATIC ECOSYSTEMS

The need for interdisciplinary education in science has now been recognized by many universities and colleges in the form of new programs of study. Nevertheless, interdisciplinary study is characterized by being typically graduate level and by a paucity of appropriate text material for either graduate or undergraduate use. Many educators believe, however, that students should be exposed to the multidisciplinary study concept as undergraduates to develop increased appreciation of each relevant discipline and acquire early the facility to comfortably move between disciplines as a normal pattern of study.

Toward achieving this goal in the interdisciplinary area of *ecological biophysics*, the National Science Foundation funded a three-year program (subsequently extended for two years into 1979) directed at the writing of modules for the purpose of teaching biology students the theory and applications of physics and physical processes in ecology. One of the unique features of the modules was the introduction of computer programs as an integral part of the modules. This presents the students the opportunity to actually use the computer to treat realistic and thus, complicated problems in ecology. Such computer programs, however, have to be highly transferable and easily adapted to most computers with minimal effort. This portability has been attained and is central to ensuring the modules' dispersion within the educational community.

A complete set of these modules will soon be available but many are available now. They are suitable for sophomores through seniors in college biology programs, but may also be used by junior college and perhaps even honors high school students. They are designed to permit each student to work at a comfortable pace, each module requiring on the average about one week's work. The optimal situation includes a teacher to guide and coordinate the process, answering questions, etc., but a self-study program is reasonable as well. Honors programs designed to encourage student initiative could incorporate these modules, possible with a term project, to provide rewarding experiences. Another group of possible users is people trained in physical theory who wish an introduction to ecological research.

Field tests of the modules have provided valuable feedback for improvements and positive commentary on the usefulness of the modules. Furthermore, we have from the beginning considered (with NSF's approval) the possibility of viewing each module as a chapter in a textbook entitled, e.g., *Ecological Biophysics*. A glance at the last two pages of this note will demonstrate that the organization of modules in terms of subject matter is well suited to the textbook-chapter format.

Faculty and students in the Center for Quantitative Science of the University of Washington wrote and/or coordinated the writing of the modules. Among those participating are a computer scientist whose interests focus upon the development of programming standards and transferable programs, other faculty and students trained in numerial analysis and physics, physical theory, wildlife, forestry, botany and marine ecology: *viz.*, all the faculty have published and taught in areas pertinent to the modules they develop. In addition, the assistance of various national experts was solicited to write modules supplementing the material developed here at the University of Washington.

At the present time, the module subject areas partition as follows:

1) thermodynamics in ecology;
2) transport processes (e.g., diffusion, convection, radiation) in ecology;
3) a review of background mathematics for the modules;
4) applied mathematics for the modules;
5) supporting computer programs and subroutines.

There will also be introductory and/or concluding module(s) on the philosophy of the use of physical theory and reductionism in biology in general. A list of the titles under the above subject areas is attached.

We feel there is a need for interdisciplinary material in this area, and we think that a book based on our materials would receive wide acceptance and fill this need. There are perhaps two other books available now which cover some of the material we treat and both authors are part of our consulting staff of experts. Their textbooks are different from our material and do not have the use of computer programs as an important part of their content.

The purpose of the above is to assist in the evaluation of the materials for possible publication in a synthesized format. Your viewpoints will be of great interest to us.

V.F. Gallucci
February 1979

edc umap

MODULES AND MONOGRAPHS IN UNDERGRADUATE
MATHEMATICS AND ITS APPLICATIONS PROJECT

The Undergraduate Mathematics and Its Applications Project (UMAP) is an NSF-funded nationwide program administered by the Education Development Center (EDC) of Newton, Massachusetts. The short-term goal of this project is to produce a wide variety of self-contained modular materials suitable for use in the undergraduate classroom. The majority of these modules emphasize significant applications of mathematics, and are designed for use by both mathematics students and students in other disciplines. A long-term goal of UMAP is to establish a self-sustaining Consortium that will continue to develop, publish, and disseminate such modules.

There are several ways in which mathematicians and users of mathematics may wish to become involved with this project:

a) Join the Consortium. There are many membership benefits, including a Newsletter and early access to new modules.
b) Review new modules.
c) Supervise student-review of modules.
d) Field-test modules in the classroom.
e) Become an author for the project. (This is an excellent way to publish a classroom gem without having to write an entire book around it.)

The project has several subject area panels (Biology, Political Science, Physics, Analysis, etc.) and the purpose of this note is to acquaint you with the goals of the Panel on Finite Mathematics. Moreover, it is hoped that you may be persuaded to become an author for UMAP.

The Finite Mathematics Panel will produce approximately fifty modules that will fall into the following three categories:

a) Examples of significant applications of topics from finite mathematics.
b) Theoretical development of some of these topics in self-contained modular format.
c) Exposition at an elementary and self-contained level of mathematical theories more commonly presented from an advanced viewpoint.

It is anticipated that a majority of the modules will be of type a), and that these will typically be most suitable for us in mathematics courses. The term "finite mathematics" will be given as broad as possible an interpretation, and will include topics from set theory, logic, linear equations, matrix theory, linear programming, game theory, computer science, graph theory, combinatorics, difference equations, probability theory, Markov chains, statistics, and even modern algebra and geometry. Each module of this type will present in a form accessible to the elementary student an example of a significant and realistic application of a mathematical topic to another discipline. A partial list of those disciplines that are known to utilize topics from finite mathematics is: anthropology, biology, business administration, computer technology, economics, environmental engineering, forestry, genetics, hospital administration, opera-

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tions research, population studies, physics, political science, psychology, sociology, theory of evolution, traffic control. Some of the mathematical applications in these areas have been well documented in popular texts, but we hope to highlight the even larger number of instances of mathematical applications that are not so widely known. Each module, in its completed form, could be used by a mathematics instructor to illustrate the importance and applicability of a mathematical topic covered in class.

However, we anticipate that instructors in other disciplines may also desire to use these modules to illustrate the importance of mathematical ideas in their subjects. Some modules will require virtually no mathematical background, but others will assume some mathematical prerequisites not typically known by students in a non-mathematical course. It is for such students that the second type of modules will be written. A module of type b) will present a brief, elementary, and self-contained introduction to the mathematical notions required for understanding a particular mathematical application. We will commission the writing of modules of this type as their need is demonstrated. These modules will find their primary use in the non-mathematics classroom.

Finally, the modules of type c) will permit a student of elementary mathematics to see and understand some recent significant results that are typically available only to more advanced students. There are many mathematical developments of recent years that have appeared only in professional journals and texts, but which could be presented (with some care and thought beforehand) at an elementary level. This is particularly true of theories falling under the general heading of Finite Mathematics. Since the bulk of the undergraduate curriculum is comprised of 19th century mathematics, the inclusion of a few recently developed ideas will give a student a better perspective about some trends in contemporary mathematical activity. Such modules could enliven the content of any mathematics course.

Every module will go through several stages of review by mathematicians, experts in the field of applications, teachers, and students. This should help the authors to produce a polished and readily-usable manuscript. In these early stages of the project, the staff of EDC-UMAP will be able to offer considerable editorial and clerical assistance, even to the extent of typing the module in the required format. Of course, as the project grows, these services will become more limited. As an additional small incentive, the Finite Mathematics Panel is able to provide an honorarium of $100 for each module that reaches stage IV of the review process. Although no strict timetables or deadlines have been established, we are anxious to begin processing modules as quickly as possible.

The Panel on Finite Mathematics is actively soliciting authors for all three types of modules, and invites you to join in this project.

Kenneth Rebman, Chairman
California State University, Hayward

Joseph Malkevitch
York College, City University of New York

Paul Pfeiffer
Rice University

John Reay
Clemson University

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AUTHORS **REVIEWERS**

FIELD-TESTERS

DESCRIPTIONS OF AVAILABLE MODULES

If you would like to participate in any UMAP Project activites, or if you have written, or know of any authors of modular college mathematics materials that we may not be aware of, please fill out and return the attached postage-paid coupon.

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Undergraduate Mathematics Applications Project

Physics Panel

UMAP is funded by the a grant from the National Science Foundation and is committed to developing - through a community of users and developers - a system of instructional modules and monographs in undergraduate mathematics and its applications. The materials are designed to be used by students in applied fields--physics, political science, biomedical sciences, psychology, economics--as well as in mathematics.

Panels have been formed in several disciplines - including physics - to solicit and review manuscripts pertinent to those areas. The Physics Panel is looking for authors, reviewers, and field-testers to get involved in the development, review, and use of materials that:

- can be used by undergraduate physics students, and
- provide training and experience in the use of mathematics in physics.

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NEWTON, MASSACHUSETTS 02160
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HOW UMAP HELPS AUTHORS

UMAP provides a chance to have short, innovative works published and widely distributed in a national peer-reviewed system. You do not have to write a whole book in order to publish your favorite way of teaching a particular topic.

UMAP provides constructive feedback from fellow teachers, mathematicians, and professional users of mathematics, as well as from typical students who have read your manuscript. Each module goes through several review stages.

UMAP provides editing, typing, graphics, and reproduction for manuscripts that are in rough but legible form.

UMAP provides professionally prepared material for your own classes.

UMAP provides complimentary copies of author's modules for department chairpeople, deans, and employees.

HOW UMAP HELPS TEACHERS

UMAP distributes quality materials which may be used for:

- supplementing existing courses,
- building mini-courses or alternative courses,
- teaching perennial problem areas in mathematics,
- illustrating unique or unusual applications of mathematics to other disciplines,
- covering topics of current interest not yet found in textbooks,
- providing remedial or tutorial assistance on an individual basis, and
- special projects for individual students.

MODULE CHARACTERISTICS

- lesson-length (2-6 student hours)
- emphasize problem-solving and real-world applications
- self-contained (except for stated prerequisites)
- stated objectives and corresponding self-tests
- answers to exercises and tests
- special assistance supplements (when appropriate)
- references to helpful materials (when appropriate)

UMAP ALSO PRODUCES

Monographs: longer pieces for undergraduates that treat new mathematics or its applications in greater depth than modules.

Index and Descriptions of Available Mathematics Modules: a survey of available modular materials in undergraduate mathematics and its applications, in the form of module description sheets, bound and indexed. The revised edition, Volume II, is currently available.

UMAP Projections: a quarterly newsletter keeping readers up to date with Project activities and module status.

UMAP Catalog: a semi-annual publication displaying module description sheets for UMAP modules in Stage IV (available for classroom use) and Stage III (available for field-testing) and listing Stage II units which may be available for field-testing in the near future.

THE CONSORTIUM

A major goal of the Project is the organization of a community of users and developers into a self-sustaining multidisciplinary Consortium that will continue to develop and disseminate UMAP materials upon termination of federal funding.

Please send me the UMAP Newsletter.

In addition, I would like:

○ to write a module entitled: ____________

____

Please send an author's manual.

○ to review units for UMAP. Please send me a reviewer background and interest form.

○ a copy of the Index and Descriptions of Available Mathematics Modules. I enclose a check for $4.00.

○ to field-test units. Please send me information and a list of available modules.

○ a copy of the UMAP Catalog.

Name ____________

Institution ____________

Address ____________

____

City ____________

State ____________ Zip ____________

UMAP PRECALCULUS MODULES

The UMAP Project (Materials and Consortium):

A primary purpose of the Undergraduate Mathematics and Its Applications Project (UMAP) is to develop self-contained, lesson-length modules from which students may learn applications of mathematics. Funded through a National Science Foundation Grant to the Education Development Center, Inc., UMAP has produced, through its Consortium (a network of writers, reviewers, testers, and users) nearly 200 modules, with over 150 others in various stages of development. To date, modules have been developed in a number of areas including the sciences, economics, political science, seismology, medicine, behavioral sciences, international relations, and statistics.

Module Sources (People and Panels):

Modules are developed primarily through two sources:

(1) by members of the UMAP Consortium and the scientific community at large,
(2) by the UMAP Subject Matter Panels.

Presently, there are nine Subject Matter Panels in the areas of: Analysis and Computation, Biomedical Sciences, Economics, Finite Mathematics, Physics, Political Science, Precalculus Mathematics, Psychology, and Statistics. Besides soliciting manuscripts for modules and coordinating the production of such modules, the Subject Matter Panels also assess the instructional needs in their particular field.

The New Precalculus Mathematics Panel (Seeks Authors):

In December 1979, the UMAP Precalculus Mathematics Panel was formed. Presently, we are seeking people who are interested in writing UMAP Precalculus modules. Such modules would:

(1) involve mathematics in which calculus is not a prerequisite,
(2) show students genuine applications of mathematics in the solution of problems that arise outside of mathematics,
(3) be an advancement over currently available materials.

THIS IS AN EXCELLENT OPPORTUNITY FOR YOU TO MAKE A VALUABLE CONTRIBUTION TO UNDERGRADUATE MATHEMATICS EDUCATION. TO WRITE A MODULE, YOU NEED NOT HAVE ANY PREVIOUS EXPERIENCE IN WRITING A TEXT OR JOURNAL ARTICLE. Many excellent modules have been developed from materials which were originally gathered for other purposes such as one-hour talks, short classroom units, articles for regional newsletters or conferences, etc. Since your module will be reviewed and classroom-tested to assure a high quality product, it need not start out as a polished, finished manuscript. Also, the UMAP office provides substantial author support in terms of typing, editing, graphics, and reproduction.

Module Format:

Besides showing students how mathematics can be used to solve problems outside of mathematics, a typical UMAP Precalculus module will have the following features:

(1) a list of prerequisites that need to be satisfied before a student can begin the module,
(2) a list of skills and concepts to be developed by a student who uses the module,
(3) a possible short review of mathematics that is used in the module,

(4) exercises with answers,
(5) a test keyed to the skills and concepts developed from using the module.

These items, and others, are explained in more detail in the UMAP Author's Manual and the Annotated Unit. Also, the modules are written so that their use does not require any specific experience with the particular subject matter field or any specific training in mathematical modeling.

Not all precalculus ideas or manuscripts submitted to UMAP will become a module. Among the criteria for selection are:

(1) is the module conceptually and technically accurate?
(2) is there an educational need for the module?
(3) is the module an advancement over existing materials (possibly such materials do not exist)?
(4) is the application a genuine one?

YOU and UMAP:

If you are interested in writing precalculus materials for UMAP (or if you know of people who might be interested), PLEASE contact any of the Panel members below. If your thoughts for a UMAP Precalculus module are only notes on scrap paper, please send four copies of a brief (one page) abstract indicating:

(1) a possible title,
(2) the area of application,
(3) a summary of the content,
(4) how the module would be an advancement over currently available materials.

If your thoughts are already in the form of a manuscript (not necessarily in the format for UMAP modules), please send four clear copies.

We look forward to hearing from you soon.

Professor Peter A. Lindstrom, Chairman
UMAP Precalculus Panel
Department of Mathematics
Genesee Community College
Batavia, NY 14020

Professor Roland H. Lamberson
Department of Mathematics
Humboldt State University
Arcata, CA 95521

Professor Richard G. Montgomery
Department of Mathematics
Southern Oregon State College
Ashland, OR 97520

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MODULES AND MONOGRAPHS IN UNDERGRADUATE
MATHEMATICS AND ITS APPLICATIONS PROJECT

MEMORANDUM

TO: UMAP Consortium Members

FROM: Peter A. Lindstrom, Chair
UMAP Precalculus Panel
Genesee Community College
Batavia, NY 14020

RE: The UMAP Precalculus Mathematics Panel
Needs Your Help

DATE: 2/27/80

A short time ago, a new UMAP Subject Matter Panel was formed to directly address the needs for instructional units usable in precalculus settings. As Chairman of this panel, I am asking for your help in filling out the enclosed questionnaire and returning it as soon as possible. Your answers will provide invaluable "grass-roots" information for the panel as it attempts to determine specific areas for the development of UMAP precalculus modules. Although "precalculus mathematics" has numerous meanings and covers many areas of mathematics, the Panel's primary concerns will be those areas in which calculus is not a prerequisite.

As you know, a unique feature and strength of the UMAP Project is its network of involved classroom teachers and department representatives. With your help, the Project is better able to sense and to respond to real instructional needs.

If you return the questionnaire by April 9, 1980, the Precalculus Mathematics Panel will be able to use your suggestions at its next working meeting in mid-April. I look forward to hearing from you.

EDUCATION DEVELOPMENT CENTER
55 CHAPEL STREET
NEWTON, MASSACHUSETTS 02160
TELEPHONE 617 969-7100

UMAP PRECALCULUS MATHEMATICS PANEL QUESTIONNAIRE

1. In what specific applications areas do you think there is a need for the development of Precalculus UMAP modules?

2. What specific precalculus mathematical skills (e.g., the Pythagorean Theorem, the Quadratic Formula, etc.) do you think would be particularly nice to have applications developed into modules?

3. If you are able, indicate the names and addresses of potential authors of the above modules. (Do not hesitate to list yourself.)

4. Indicate if you, or colleagues at your institution, would be willing to help in the development of UMAP Precalculus modules. UMAP needs: authors, reviewers, student review advisors, classroom testers, modules users providing feedback, etc.

5. Other comments, suggestions, etc.

NAME ______________________________

INSTITUTION ______________________________

DEPARTMENT ______________________________

CITY, STATE, ZIP ______________________________

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MODULES AND MONOGRAPHS IN UNDERGRADUATE
MATHEMATICS AND ITS APPLICATIONS PROJECT

oject Director
ss L. Finney
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sociate Director
nsortium Coordinator
Solomon Garfunkel
University of Connecticut

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tistics Panel
Douglas A. Zahn, Chair
Florida State University
n leave at Harvard University
til August 1979)

Roger Carlson
University of Missouri
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d Faulkner
gham Young University

Tom Knapp
iversity of Rochester

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University of Kentucky

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Mansfield State College

tistics Panel
visory Committee
Donald Guthrie
University of California
Angeles

n Joiner
University of Wisconsin
Madison

derick Mosteller
rvard University

STATISTICS PANEL

GOALS AND ACTIVITIES STATEMENT

BACKGROUND:

The Undergraduate Mathematics Applications Project (UMAP) is an NSF-funded nationwide program administered by Education Development Center, Inc. of Newton, Massachusetts. The short-term goal of this project is to produce a wide variety of self-contained modular materials and monographs suitable for use in the undergraduate classroom. In this project a module contains approximately the amount of material covered during a conventional one-hour class period. Physically, each module will be a pamphlet of approximately fifteen pages, containing a statement of the objectives the student is to achieve in the module, prerequisites, the material itself, exercises, answers, and a quiz. The modules are designed to support any instructional style, from conventional lecturing to totally self-paced instruction. The project has been in operation since 1976, and has produced approximately 90 modules as of February 1979, in such fields as biomedical sciences, economics, American politics, harvesting, international relations, numerical methods, computer science, earth science, and navigation.

Panels or committees in several disciplines including Physics, Biomedical Sciences, Analysis, Finite Mathematics, and Statistics have been organized. These panels are responsible for soliciting and collecting manuscripts appropriate to their own field and reviewing the manuscripts once they have been received. A long-term goal of UMAP is to establish a self-sustaining Consortium that will continue to develop, publish, and disseminate such modules after the termination of NSF funds. At the present time, modules produced by UMAP are being used in hundreds of universities, four-year, and two-year colleges in the United States.

GOALS OF THE STATISTICS PANEL:

The goal of the Statistics Panel is the production of approximately 50 modules. Some of these modules would introduce modern statistical techniques, (e.g., robustness, randomized response techniques, reliability, exploratory data analysis, etc.), explore probability modeling, applications of existing techniques, etc. Others might give careful expositions of more standard topics in self-paced and self-contained form. We envision that many of these modules will be useful at the introductory course level and others at more advanced levels. The modules are intended for use in introductory courses in various subject matter areas.

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The Statistics Panel will be inviting some modules, but is also actively soliciting the contribution of outstanding educational materials which have not seen the light of day beyond the institution of the writer.

Every module will go through several stages of formative review by statisticians, experts in the field of applications, teachers, and students. This will help the authors to produce a polished and readily-usable manuscript. The staff of UMAP offers considerable editorial and clerical assistance, even to the extent of typing the module in the required format.

YOUR PARTICIPATION:

The project is well underway. We invite anyone involved in teaching or using statistics to join us in any one of the following ways:

a) Put your name on our mailing list, so that you may receive the project Newsletter.

b) Review new modules.

c) Supervise student-review of modules.

d) Field-test modules in the classroom.

e) Become an author for the project. (This is an excellent way to publish a classroom gem without having to write an entire book around it!)

If you would like more information or if you would like to participate in any way, contact Doug Zahn, EDC/UMAP, 55 Chapel Street, Newton, MA 02160.

Statistics (Spring 1979)

Please check the boxes which indicate the topics and fields of application for which you would like to review units. Would you be reviewing them from a statistical _____, applications _____, or pedagogical _____, viewpoint? (Check one or more of the above.)

Name: ______________________________

Department: __________________________

Institution
Address: ____________________________
____
____

	FIELD OF APPLICATION								
TOPIC	Biological Sciences	Earth Sciences	Economics	Engineering	Environmental Studies	Physical Sciences	Psychology	Sociology	Other: ______
1. Elementary Probability*									
2. Elementary Statistics*									
3. Mathematical Statistics									
4. Sample Surveys									
5. Multiple Regression									
6. Design of Experiments									
7. Analysis of Variance									
8. Stochastic Processes									
9. Data Analysis									
10. Graphics									
11. Reliability									
12. Nonparametrics									
13. Time Series									
14. Operations Research									
15. Multivariate Analysis									
16.									
17.									

*Topics covered in "typical" noncalculus, introductory, first course in this area.

Please feel free to add to this list of topics and fields of application.

__ I am interested in writing a unit. Please send me information.

__ I am interested in class testing a unit. Please send me information.

Please return to EDC/UMAP, 55 Chapel Street, Newton, MA 02160.

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MODULES AND MONOGRAPHS IN UNDERGRADUATE
MATHEMATICS AND ITS APPLICATIONS PROJECT

November 1978

UMAP MONOGRAPH SERIES

The National Science Foundation has awarded a grant to Education Development Center, Inc. (EDC) to develop "Modules and Monographs in Undergraduate Mathematics and its Applications Project." The Project will use the acronym UMAP (Undergraduate Mathematics Applications Project).

The modules and monographs serve two overlapping purposes. The emphasis of the modules is to improve the teaching of mathematical skills and concepts by developing lesson-length units on topics of recognized importance to undergraduate education in the sciences.

The monographs, on the other hand, are meant to bring new mathematics and fresh applications of mathematics to the undergraduate student without the usual long time lag between the development of an idea and its implementation in the undergraduate curriculum. In some cases the monographs will build on topics presented in the modules. Both the modules and the monographs may be arranged in course sequences or can be selected to meet the needs of specific students.

The monographs will be developed by UMAP's Monograph Editorial Board and by UMAP's individual Subject Matter Panels, by inviting manuscripts on new topics which would be of interest and use to majors in mathematics, majors in disciplines that make use of mathematics, or to both of these groups. The monographs may focus either on applications of mathematics with some discussion of the underlying mathematics, or on applicable mathematics with some discussion of application. Subjects which are being developed include: spatial models of election competition, generalized inverses for matrices, population modeling, conditional independence in applied probability, optimization of rocket trajectories, and analytic photogrammetry. These

(Over)

ADDENDUM H

PROJECT STAFF

Felicia M. DeMay, Associate Director (July 1977 - present)

Donna DiDuca, Project Secretary/Production Assistant (September 1979 - present)

Ross L. Finney, Senior Mathematics Editor (July 1976 - September 1977)
Project Director (September 1977 - present)

Carol Forray, Technical Typist (December 1978 - September 1979)

Solomon A. Garfunkel, Consortium Director (July 1976 - present)

Thomas Good, Editorial Assistant (July 1976 - June 1977)

Al-lyce James, Secretary/Administrative Assistant (August 1976 - March 1977)

Barbara Kelczewski, Coordinator for Materials Production (July 1977 - present)

Dianne Lally, Project Secretary (June 1977 - September 1979)

Paula M. Santillo, Assistant to the Directors (September 1977 - present)

Joyce Taggart, Editorial Assistant (February 1977 - July 1977)

William Walton, Project Director (July 1976 - September 1977)

Janet Webber, Word-Processor (November 1979 - present)

Zachary Zevitas, Staff Assistant (September 1977 - present)